

A Preliminary Discussion on the Application of VR Technology in Television Programs (Post-print)

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Abstract

The continuously evolving technologies in automation, electronics, and computer science not only render television programs more convenient and efficient, but also enhance their realism and immersive quality. Virtual reality technology represents one of the special effects technologies frequently employed in contemporary television program production. Producers of current television programs spanning lifestyle, military, educational, entertainment, sports, and news genres have discovered an innovative instrument within the context of diversified media development, providing practitioners with a technical vehicle for artistic innovation that enables them to secure a competitive advantage in the fierce market landscape. In this paper, the author, drawing upon practical work experience, explores the application of VR (virtual reality) technology in television programming for reference purposes.

Full Text

Preamble

Abstract: The continuous development of automation, electronics, and computer technologies has not only made television production more convenient and efficient, but also enhanced the realism and immersive experience of programs. Virtual reality technology has become one of the key special effects technologies frequently employed in contemporary television production. In today's diversified media landscape, producers of lifestyle, military, educational, entertainment, sports, and news programs have discovered an innovative tool for exploration and creativity, providing practitioners with a technical platform for artistic innovation that helps them gain competitive advantages. Drawing from practical work experience, this paper examines the application of VR virtual reality technology in television programs for reference.

Keywords: VR virtual reality technology; television programs; application

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1. Classification of Virtual Reality Technology

Generally speaking, virtual technology can be divided into four categories: First, immersive. This type requires users to utilize specialized equipment such as tracking devices and head-mounted displays to freely interact within computer-generated virtual worlds, thereby fully experiencing the immersive nature of virtual technology. Second, desktop. As the name suggests, desktop virtual technology employs displays to present virtual scenes, which users can control through related devices such as data gloves and input devices to achieve human-computer interaction. Third, distributed. Distributed virtual technology is essentially a shared virtual environment that connects multiple users through a network, allowing them to simultaneously experience the same virtual world. Fourth, augmented reality. This technology enhances real-world environments by overlaying virtual scenes created with computer 3D graphics, producing composite scenes nearly identical to reality that are difficult to distinguish. Users experience these overlaid scenes through specialized equipment.

2. Application of VR Technology in Television Programs

Based on computer simulation technology, VR creates simulated real-world environments and, through human-computer interaction, places users within these realistic settings. In recent years, VR has become a major trend, with numerous production companies launching VR-enabled variety shows.

2.1 Application in Variety Shows

VR technology has emerged as a significant trend, with many production companies introducing variety shows utilizing this technology. For instance, the fourth season of Hunan TV's self-produced program *I Am a Singer* incorporated VR technology. During production, the program deployed a total of 20 panoramic camera positions, primarily consisting of RED DIGITAL arrays and GoPro arrays, to comprehensively capture the entire performance area and transform every location into part of the stage—representing a technical revolution for *I Am a Singer*. In early 2016, as the internet and animated film industries were preparing to invest in VR, *I Am a Singer*, as a domestic phenomenon-level music program, made significant innovations by employing emerging domestic VR technology to recreate both the competition site and singers' rooms [2]. During recording, cameras were positioned around the stage and in various rooms, capturing the complete atmosphere, lighting, and sound effects through VR video.

When audiences watch the program through VR technology, they can fully experience the singers, stage design, band, and live audience reactions without any loss of the musical feast. This innovation not only breaks the tradition of passively watching programs on television or online, but also bridges the distance between singers and audiences (to 1.2 meters), representing the first domestic attempt of its kind and a bold breakthrough for cutting-edge technology in television programs.

2.2 News Scene Simulation

Traditional television news primarily comprises two elements: news footage and text [3], which complement each other and are both indispensable. Against the backdrop of continuously developing information technology, news reporting is evolving toward greater technical sophistication. Typically, VR technology simulates news events to create an immersive experience for audiences, recreating scenes such as accidents, crime scenes, and other event sites—especially those that cannot be accurately reconstructed in reality or are difficult to film—allowing viewers to “experience” the actual occurrence process more comprehensively. Furthermore, to enhance news visuality, VR technology can be employed during news production to simulate events through 3D graphics, presenting stories that are difficult to reconstruct or cannot be effectively conveyed through verbal description alone. For example, when CCTV-13’s *Morning News* reported on the potential eruption of a supervolcano at Yellowstone in the United States, it utilized VR technology to simulate the volcanic eruption scenario, including seismic waves and magma activity, to help audiences better understand that the eruption’s power far exceeded expectations and to clarify the potential affected areas. Additionally, various other news simulations employ virtual reality technology, such as hostage rescue demonstrations, crime scene reconstructions, and traffic accident simulations. Through VR applications, news broadcasting becomes more vivid and intuitive, effectively capturing audience attention while creating more memorable impressions of news content.

2.3 Principle and Process Demonstration

VR technology in television programs also demonstrates processes, principles, and scientific technologies. Many scenes in real life cannot be reconstructed, involve high production costs, or are difficult to film, such as carrier rocket launches, rocket stage separation, satellite deployment into predetermined orbits, and other processes—all of which can be digitally simulated through 3D technology. Notably, before simulating these scenes, it is necessary to establish virtual models that accurately reflect the real appearance of objects, which can then be manipulated to achieve dynamic virtual motion. VR technology can shorten testing and development cycles, reduce basic costs, and yield high-quality experimental results [4]. Virtual technology can also simulate numerous complex physical phenomena; for instance, during rocket launches, it can first simulate 3D dynamic scenes and then present a more intuitive and vivid launch

process through sound and 3D animation.

Additionally, VR technology is employed in follow-up reports on mining accidents. Due to various environmental and procedural constraints in coal mining operations, filming is extremely difficult, and mining accidents are sudden events that are challenging to capture on camera. When analyzing accident causes and demonstrating mining processes, VR technology is used to create 3D simulations of the actual mining environment and operations, enabling the system to virtually demonstrate the coal mining environment and process for more in-depth accident analysis. Moreover, virtual reality technology has been applied in the demonstration of restoration projects. For example, the documentary *The Forbidden City* used 3D simulation to recreate the construction process of pavilions and towers, showcasing the exquisite craftsmanship of ancient Chinese architecture and deepening audience understanding of traditional building techniques.

Conclusion

In summary, virtual reality technology represents a new technology that aligns with the psychological needs of television audiences and the future development of television production technology, capable of delivering significant commercial and cultural value. Television production professionals must master virtual studio and virtual implantation technologies to provide audiences with better psychological, sensory, and visual experiences. While widely applied in sports, entertainment, news, and lifestyle programs, television production staff should employ this technology scientifically and rationally to avoid misuse or abuse, thereby ensuring the stable development of this television production technology.

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Note: Figure translations are in progress. See original paper for figures.

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