An Exploration of the Development of Interactive Films Based on Virtual Reality Technology (Postprint)

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Abstract

Currently, computer network technology and internet digital new media technology are undergoing vigorous development. Among these, virtual reality (abbreviated as VR) technology has emerged as a pivotal turning point in response to the advancement of the times. As an unprecedented spatial interactive experience technology, it serves as a bridge between the film industry and computer technology, thereby realizing an unprecedented interactive film model. Based on the current status and characteristics of interactive film and virtual reality technology development, this paper analyzes and explores prospective integration directions and development opportunities for virtual reality within interactive cinema, briefly elaborates on the novel experiences and feedback information that VR technology brings to the public, with the aim of facilitating more effective reflection upon and application of digital media in the future.

Full Text

Exploring the Development of Interactive Cinema Based on Virtual Reality Technology

Abstract: Today, computer network technology and internet-based digital new media are developing vigorously. Among them, Virtual Reality (VR) technology has emerged as a pivotal turning point of our era. As an unprecedented spatial interactive experience technology, it bridges the film industry and computer science, enabling a novel interactive cinema model. Based on the current status and characteristics of interactive cinema and VR technology development, this paper analyzes and explores potential directions and prospects for their future integration, briefly elaborates on the new experiences and user feedback that VR technology brings to the public, with the aim of better reflecting upon and applying digital media in the future.

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1.1 Overview of Interactive Cinema

Interactive cinema represents a hybrid of film and gaming that employs both live-action filming and animation production to achieve media convergence. While its foundation remains cinematic, it presents audiences with the interactive fusion of gaming' s "play" and film' s "view" characteristics. Previously, technological limitations prevented interactive cinema from reaching mass audiences. The 16-bit screens yielded crude production values and unrefined visuals, while the interactive experience lacked fluidity and intelligence. Audience reception was poor, with many preferring to watch a well-crafted conventional film rather than waste time on these early experiments.

Moreover, as interactive cinema entered commercial operation, its dual nature as both film and game created unique challenges: it had to balance cinematic construction with gameplay experience. However, the playability of interactive cinema never matched that of major gaming platforms. During the 1990s, when both film and gaming flourished, audiences preferred direct experiences with titles like Nintendo and Red Alert, which constrained interactive cinema' s development. Today, interactive cinema persists in a special form within games, using narrative transitions to create immersive experiences from gaming' s inherent artistic qualities. While significant improvements have been made in cinematography, editing, sound, storytelling, and character movement, gaps remain compared to pure animated films, requiring continuous future refinement.

1.2 Current Development Status of Interactive Cinema

Interactive cinema began its evolution after the first 3D technology in 1922, gradually developing toward full-motion video games. Its center of gravity shifted from the film industry to the gaming sector, initiating a long-term pattern of live-action game videos. Early productions featured low costs and simple plot modes, where audiences merely selected video segments to advance game narratives—essentially designing their own cinematic game experience and pushing the "film" plot according to their preferences. This model, known as FMV (Full Motion Video) games, represented the embryonic form of interactive cinema.

However, since the 1990s when major gaming platforms became prevalent, interactive cinema' s development stagnated. It failed to gain widespread attention

in either the film or gaming industries. Many game developers were reluctant to integrate their games into films, as the games themselves generated substantial social impact through pure gameplay. Meanwhile, the film industry focused its efforts on developing 3D modes and special effects blockbusters.

2.1 Overview of VR Technology

Virtual Reality, fully termed "Virtual Reality" and abbreviated as "VR," constitutes a computer-simulated data space that physically depends on real objects and environments. While theoretically feasible, many practical situations once rendered it impossible. VR technology formally applies this previously impossible theory by using computers to simulate an N-dimensional spatial environment, allowing participants to enter virtual spaces through VR equipment. This enables simulated perception across visual, auditory, and tactile senses, while allowing users to perform actions and issue commands to surrounding objects, achieving interactive experience between virtual and real.

Currently, VR technology primarily focuses on deeply tapping into human visual perception in virtual worlds to create immersive realism. The VR industry' s direction is clear, delivering services through platforms and hardware with head-mounted devices as the primary carrier. VR is now widely applied not only in gaming and film but also in aerospace, education, entertainment, industrial sectors, and beyond.

2.2 Current Application Status of VR Technology in the Film Industry

VR remains in an exploratory phase within contemporary cinema. Neither VR films nor VR games have gained widespread recognition, creating a significant status gap compared to mainstream cinema. VR film implementation requires audiences to first possess VR equipment or visit VR experience centers, unlike traditional films that only require a theater visit. Additionally, its cumbersome industrial chain creates limitations for mass promotion.

Furthermore, in currently realized VR films, most audiences report insufficient sense of participation. In full-view environments, viewers feel more like spectators watching characters move on screen, similar to traditional theater stages, without substantial improvement in active control or the ability to alter medium, close-up, and extreme close-up shots.

VR film development presents both advantages and disadvantages. The advantage lies in extending and expanding the real world, while the disadvantage is that traditional filmmaking methods can no longer satisfy VR' s demands, necessitating further exploration.

3.1 Development Advantages of VR Technology in Interactive Cinema

VR technology currently requires a breakthrough from its bottleneck state, and interactive cinema' s demand for experiential interactivity provides an ideal platform. With VR support, interactive cinema can better create human-film interaction modes, while VR technology need not be confined to traditional film language, opening new pathways. Consequently, audiences become active participants rather than passive viewers, gaining greater autonomous choice and blending reality with virtuality seamlessly.

In a sense, interactive cinema liberates audience thinking from passively accepting narrative progression. When we become film participants and VR technology elevates this participatory thinking to the peak of real-world interaction, true human-film interactivity is achieved. Moreover, VR interactive cinema can pre-design game elements, allowing players to focus entirely on narrative design while scene tasks naturally interact with them. Film content and themes can also be adapted through first-person modifications without concern for lacking audiences.

3.2 Development Trends: Immersive Experience

A novel VR-based interactive cinema form is currently emerging and continuously evolving: immersive experiential sensation. This new experience features two modes: First, 360-degree full-surround environments allow audiences to experience different film zones through head and body movements, enabling multiple scenario modes within a single VR film and achieving true "presence." Audiences report this viewing mode' s immersion far surpasses theater IMAX. Second, human-computer interactive immersion employs directors' use of sound and gestures to guide audiences through 360-degree scenes, merging with film narratives and making details more accessible. For instance, in the classic film *Jurassic Park*, audiences can become the protagonist, walking into the park, advancing with the plot, and when dinosaurs appear, "personally" observing their details, even "touching" their skin and feeling their heartbeat.

3.3 Technical Development of VR Technology in Future Interactive Cinema

Recent years of exploration and research have established foundations and experience for VR technology in both film production and game development, promising bright prospects for interactive cinema' s future. However, we must not overlook technological progress and refined film production. Directors and screenwriters still bear irreplaceable responsibilities, and while transitioning to VR interactive cinema, film genre and style classification must be maintained. Secondly, scripts remain the most crucial element in VR films, just as in traditional cinema. Since audiences become the main agents guiding plot development, orchestrating script design becomes particularly vital. Future efforts must create richer storylines, continuously accumulate experience and audience

feedback, and adapt to multi-ending interactive film scripts.

Additionally, cinematography must advance to meet VR' s demands. Special photographic techniques like "slow motion," "freeze frame," and "high-speed photography" fundamentally determine how participants control film scenes. Since interactive cinema' s scenes and angles are audience-selected, this mode resembles stage blocking. Like Bazin' s long take theory, VR technology brings audiences a sense of presence, making surroundings feel incredibly real, so mastering on-site visual choreography is essential. Finally, VR interactive cinema editing leans more toward theater than traditional film, delivering each frame accurately to audience perception.

4. Conclusion and Outlook

In summary, this paper comprehensively elaborates and analyzes VR as an integrated audio-visual technology, proposes referential analytical opinions on its development and application prospects in interactive cinema, and explores future immersive experiences and technical updates. VR offers audiences not merely a visual and auditory feast but more importantly, elevates spiritual pleasure and cerebral perception, bridging the distance between humanity and film while achieving development through continuous innovation.

In conclusion, VR technology will not stagnate. It will continuously innovate with era and technological progress, thereby advancing the film industry' s growth and constantly satisfying human desires for new experiences and contemplation of future worlds.

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