Analysis of Multimedia Computer Technology Applications in Broadcasting Engineering: Post-print

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Abstract

Under the development of modern multimedia network information technology, computer technology has found increasingly extensive application in radio and television engineering. From micro to macro levels, the mutual integration between traditional media and network computer information technology is evident, representing a significant industrial transformation opportunity for radio and television engineering. This paper will conduct a comprehensive analysis of the integration between computer technology and television projects in recent years, and present relevant elaboration on the application of computer technology in radio and television engineering.

Full Text

Analysis of Multimedia Computer Technology Application in Radio and Television Engineering

Abstract: With the development of modern multimedia network information technology, computer technology has found increasingly widespread application in radio and television engineering. The integration of traditional media and network-based computer information technology is evident at both micro and macro levels, representing a significant industry transformation opportunity for broadcasting. This paper provides a comprehensive analysis of the integration of computer technology with television projects in recent years and elaborates on the application of computer technology in radio and television engineering.

Keywords: multimedia; computer technology; radio and television engineering; application

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In today's landscape, the challenge facing multimedia computer technology and radio and television engineering lies in identifying positions for mutual cooperation and progress amidst the currents of technological change. Undoubtedly, computer technology has facilitated breakthroughs in broadcasting engineering techniques and service upgrades, yet numerous underlying issues require resolution. Therefore, we must conduct a detailed analysis of multimedia computer technology applications from multiple perspectives to address existing implementation challenges and prepare for future development opportunities.

1.1 Objectives for Multimedia Computer Technology in Broadcasting Engineering

From the perspective of network technology development, research on distributed virtual environments has become a key focus in virtual reality technology development. The primary objectives for multimedia computer technology in broadcasting engineering must first be clearly defined: (1) improving the efficiency of established information models; (2) perfecting both component-level and overall information model content; (3) implementing personalized designs to enhance realism for all participants; and (4) adopting multi-angle, multi-channel approaches rather than relying on a single channel.

Based on these four objectives, scientific and effective analysis and computation should be conducted, beginning with foreseeable problems—particularly those that are obvious, universally applicable, and relatively easy to publicize. However, existing limitations of computer technology must not be ignored. Although current digital media technology enables preliminary analysis of user perception and cognition, the critical challenge remains perfectly bridging high-level semantics stored in multimedia databases with collected low-level features.

1.2 The Necessity of Multimedia Computer Technology in Broadcasting Engineering

This necessity cannot be overlooked. Based on past experience, hardware functional deficiencies previously required substantial human, material, and risk investments to achieve current objectives. Today's computer technology development has precisely filled these gaps. Computer programs can be edited and encrypted by professional programmers, offering unparalleled storage performance compared to other media or spaces for the convenience of space-saving and operational ease. In summary, the integration of computer technology with broadcasting work is undoubtedly beneficial. Key considerations when merging computer technology with broadcasting engineering include:

First, broadcasting engineering has strict requirements for television picture clarity and radio sound quality. Therefore, from the perspective of signal loss, multimedia computer technology must continuously improve broadcasting engineering through transmission method upgrades from a design standpoint and effective management via computer systems.

Second, to avoid picture distortion during television broadcasting, station operations are extremely sensitive to magnetic field interference. While playback effects for in-house live programs remain controllable, field broadcasts in special environments may encounter unpredictable problems. Multimedia computer technology can compensate for these issues by enhancing signal transmission strength during live broadcasts to prevent any conditions that might affect television transmission.

Third, the authority and stability of news dissemination require coordination between computer technology and broadcasting engineering. Signal interruption is absolutely unacceptable during news broadcasts, making it crucial for computer technology to maintain diversified transmission methods. Technical personnel must prioritize signal stability in engineering design to ensure functionality when critically needed.

1.3 The Inevitable Trend of Integration

From the perspective of necessity, the development history of radio and television broadcasting reveals that broadcasting engineering demands high signal transmission speed and quality. Due to its particular characteristics and historical evolution, broadcasting engineering has substantial storage requirements. Finally, we must address the inevitable integration trend between these two industries, as shown in Figure 1 [Figure 1: see original paper]. At the micro level, the dominance of the media industry must be ensured—that is, the media industry remains the leader in integration with multimedia computer technology. At the meso level, this alliance involves inseparable cooperation among three industries: telecommunications, IT internet, and media. At the macro level, this represents the convergence of information and cultural industries.

The advantages of computer technology—portability, programmability, enhanced encryption reliability, and upgrade scalability—will significantly benefit broadcasting engineering cost maintenance. Two methods typically enable efficient computation: large-scale scientific computing and large-scale data processing, both requiring powerful computer storage performance. Therefore, further development of computer technology storage functions is necessary for more advanced application research and breakthroughs.

2.1 Application in Broadcast and Television Media Engineering

Before computer technology became widespread, traditional broadcast and television media output audio and video by converting all broadcast content into digital analog signals. A significant drawback of digital analog signals is their high susceptibility to environmental interference, requiring considerable personnel to ensure signal stability for live broadcasts or forcing most programs into prerecorded formats, resulting in universal content lag. Multimedia computer technology innovation has fundamentally transformed analog signals into digital signals, greatly improving overall transmission efficiency and quality, enhancing

playback standards, and enabling ideal digital television experience systems that enrich viewer choices.

2.2 Application of Network Engineering Technology in Broadcasting Engineering

The collaboration between broadcasting engineering and network engineering technology has evolved from unilateral television program output to integrated systems. This partnership has achieved the transition from analog to digital signals while effectively combining traditional circuit communication switching theory, broadcasting network distribution theory, and computer network packet switching theory. These integrated theories have transformed user lifestyles. Subsequently, digital application platforms centered on broadcasting media emerged, breaking through previously impossible technologies and shifting from traditional narrowband internet multimedia to massive online data exchange. To date, the integration of computer technology has completely transformed overall transmission technology and media. Network transmission modes and efficiency have substantially improved broadcasting engineering operational effectiveness, while radio and television program delivery scope has expanded, enabling numerous cross-industry collaborations. In media networks, network engineering technology has helped broadcasting achieve improvements in user information functionality and signal demand fulfillment while facilitating service integration. This has broken traditional middleware structural constraints, enabling distributed system development and expansion centered on new network middleware, integrating internet heterogeneity and achieving complementary integration between cable television networks and the internet.

2.3 Computational Processing Capabilities of Multimedia Computer Technology in Broadcasting Engineering

Continuous updates in computer technology storage and architecture have profoundly impacted broadcasting engineering. As user demands and interests evolve, computer technology has made storage and computing devices increasingly efficient, fast, and energy-saving. The current priority involves introducing sophisticated computer technology into broadcasting engineering construction to continuously create new possibilities, expand domains, and discover additional functions.

2.4 Application in Post-Production for Broadcasting Engineering

Post-production is critical and demanding for broadcasting programs, representing the final stage before official broadcast where minor errors can cause broadcasting accidents. Computer technology introduction has substantially streamlined post-production processes, making them faster and simpler while simultaneously improving quality. Previously, live programs relied on cameramen recording guests and hosts, while radio depended on anchors and audio engineers—a workflow that posed challenges for post-production workload and

efficiency improvement. Advances in computer technology enabled digital nonlinear technology application, eliminating the need for post-production staff to repeatedly review video and audio materials for editing. Required materials can now be placed into software according to position for processing using editors, planar technology, and 3D technology to add post-production effects. For instance, Premiere video editing software has been widely applied in modern post-production, providing excellent conditions for program quality and efficiency improvement.

3. Conclusion

In summary, multimedia computer technology has demonstrated tremendous impact and improvement on broadcasting engineering. Computer technology has become a powerful systematic industry, with nearly all advertising channels achieving promotional effects through network information. This presents both a crisis and an unprecedented development opportunity for the television broadcasting industry. For broadcasting engineering, seizing this opportunity and meeting these challenges requires unremitting effort and contemplation from all practitioners.

References: [1] Chen Jianping. Analysis of Multimedia Computer Technology Application in Broadcasting Engineering[J]. Science and Technology Communication, 2017(02): 52-53. [2] Lu Changming. Exploration of Computer Technology Application in Broadcasting Engineering[J]. News Communication, 2017(08): 99, 101. [3] Chen Sijun. Computer Technology Application in Broadcasting Engineering[J]. Computer Knowledge and Technology, 2016(14): 227-228. [4] Reyilanmuhan · Maitikiasimu. Multimedia Computer Technology Application in Broadcasting[J]. Electronic Technology and Software Engineering, 2016(20): 172.

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