# Analysis of Multimedia Computer Technology Applications in Broadcast Television Engineering (Postprint)

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## Abstract

Since 1956, when Premier Zhou Enlai officially incorporated computers into the key priorities for science and technology development, China' s computer sector, despite commencing over a decade later than developed countries such as the United States, has continuously confronted challenges head-on and surmounted numerous technical obstacles. Presently, computer technology is being increasingly and extensively applied across various industries, and has become the technical foundation upon which numerous fields depend. Having now crossed the first two decades of the 21st century, computer technology has achieved relatively prominent application results in the field of radio and television engineering. This paper primarily analyzes the application of multimedia computer technology in radio and television engineering, starting from the current status of such applications, to explore effective pathways for practical implementation.

## Full Text

## Preamble

**Title:** Analysis of Multimedia Computer Technology Application in Radio and Television Engineering

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**Abstract:** Since Premier Zhou Enlai formally included computers in China' s key scientific and technological development priorities in 1956, the nation' s computer sector has made remarkable progress despite starting more than a decade later than developed countries such as the United States. Today, computer technology is increasingly applied across all industries and has become a foundational technology for many fields. As we cross the first two decades

of the 21st century, computer technology has achieved particularly notable results in radio and television engineering. This paper analyzes the application of multimedia computer technology in radio and television engineering, examining current implementation status to identify effective pathways for practical application.

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In the era of rapidly developing multimedia network technology, computer network technology has gradually been applied to radio and television engineering, driving development in the broadcasting field while helping to overcome numerous latent challenges. To flexibly integrate multimedia computer technology into radio and television engineering, we must promptly identify existing application problems and seek effective solutions to promote stable development in the broadcasting sector. The following sections provide a detailed analysis of multimedia computer technology application in radio and television engineering.

## 1.1 The Meaning of Multimedia Computer Technology

Multimedia computer technology refers to the use of modern technologies—including computer network technology, big data technology, and information processing—to upgrade and enhance images, videos, and audio stored on multimedia devices. Beyond simple material compilation, it improves the presentation quality of production outcomes and transmits information through broadcast television platforms to provide high-quality content that meets diverse audience needs across different domains. Computer multimedia technology encompasses rich and varied content; when integrating and processing information, it typically involves not a single technical form but rather the superposition of multiple technologies. Through the close coordination of various technologies and the rational integration of information materials, higher-quality radio and television programs can be produced. The application of multimedia computer technology in radio and television engineering is essential for meeting the development needs of the broadcasting field. This requires a thorough understanding of the characteristics and application pathways of various technologies, combined with the actual demands of radio and television engineering, to better demonstrate the value of computer multimedia technology [1].

## 1.2 Application Objectives of Multimedia Computer Technology in Radio and Television Engineering

Based on the current state of domestic computer network technology development, rapid comprehensive progress has laid a solid foundation for the stable de-

velopment of the broadcasting field. Scholars and technicians have invested considerable time and effort in researching distributed virtual environments, aiming to enable multimedia computer technology to shine more brightly in radio and television engineering. Specifically, the integration of radio and television engineering with multimedia computer technology primarily aims to achieve four major objectives: first, optimizing existing information models and enriching their content; second, building more complete information systems to improve processing efficiency; third, conducting targeted engineering optimization to deliver higher-quality experiences; and fourth, expanding information transmission pathways to present information from different angles and through different methods.

Achieving these objectives can refine the development of radio and television engineering, identify factors that may cause unexpected problems in advance, prevent issues before they occur, and comprehensively optimize key links. However, the potential technical limitations that may arise during computer technology development cannot be ignored. Although current digital media technology has already met the basic development needs of the radio and television engineering field, continuous optimization of multimedia computer technology and improvement of multimedia database construction are still required to better satisfy the demands of technological updates and applications as industry development levels gradually advance.

## 1.3 The Important Role of Multimedia Computer Technology in Radio and Television Engineering

The rapid development of new media technologies has made traditional radio and television no longer the first choice for audiences to obtain information. By examining the development of radio broadcasting decades ago and the innovative progress in radio and television in recent times, it is evident that technological optimization in radio and television engineering should focus on improving signal transmission levels, adopting effective methods to increase information transmission rates, and ensuring transmission quality [2]. Radio and television engineering is a highly specialized field whose development is not accidental but inevitable. Over time, the total volume of information generated during its development increases significantly, as do storage requirements. According to past development patterns in radio and television engineering, hardware devices often suffered from incomplete functionality and low operational efficiency, requiring substantial human and material resources to meet demands while still being unable to completely avoid risks. In the new social development context, the significantly enhanced capabilities of computer technology have effectively compensated for these shortcomings. Computer programs applied in radio and television engineering can be customized or upgraded by programmers according to actual needs, enabling storage of larger volumes of information while reducing storage space requirements. Overall, for radio and television engineering, the role played by computer network technology is unmatched by other

technologies.

To maximize the application advantages of multimedia computer technology, continuous adjustments to technical forms are needed to better integrate with broadcasting engineering. First, although radio and television are traditional media, they should not be considered "outdated"media. Every media format was new when it first emerged, so the ability to see images on television was initially a surprise for audiences. However, today' s audiences expect higher-quality images and more intuitive information extraction, and many interference factors in radio and television engineering operations can reduce picture quality. During live television broadcasts, playback effects are within technicians' control, but special control methods are required for programs broadcast in specific scenarios. While potential problems cannot be completely avoided, effective measures must be taken to compensate for technical system deficiencies, improve signal transmission quality, and create favorable conditions for signal transmission and program output.

Second, radio programs primarily transmit information through sound, while television programs require a combination of sound and images. With changing times, audiences have raised new requirements for both audio and visual quality in radio and television engineering—demanding high clarity for both sound and picture. Unnecessary loss during signal transmission may lead to quality degradation [3]. Therefore, we must provide higher guarantees for signal transmission quality, starting from the initial design phase to select effective transmission forms and create integrated computer transmission systems.

Finally, radio and television are primary channels for news information dissemination. A scholar once conducted a survey among audiences showing that when traditional and new media report on the same event with inconsistent viewpoints or content, most audiences choose to trust traditional media, demonstrating the authoritative nature of radio and television information. During live news broadcasting, ensuring signal stability is particularly critical, requiring increased maintenance frequency of computer information systems, adoption of more reliable information transmission forms, and improvement of radio and television engineering design systems [4].

## 1.4 The Integration Trend of Radio and Television Engineering and Multimedia Computer Technology

The development of radio and television engineering requires support from multimedia computer technology, while the upgrading of multimedia computer technology also needs practical applications to open new pathways. Based on actual conditions, the application of multimedia computer technology in radio and television engineering must follow the development laws of the broadcasting field, with radio and television as the leading force. In this process, not only do radio and television engineering and multimedia computer technology continuously upgrade and progress, but related big data technology and telecommunications

transmission fields also achieve significant development. Fundamentally, the application of multimedia computer technology in radio and television engineering has become an irreversible trend and an inevitable requirement for information field development and cultural industry progress in the context of core industries in the new era.

## 2.1 Application of Multimedia Computer Technology in Radio and Television Media Engineering

First, computer network technology has become a frequently used technology in people' s daily work and life. Although remarkable achievements have been made in computer technology application, the concept of continuous technological innovation must be maintained. Over its long development history, radio and television have gradually found suitable information transmission methods, transmitting program content to audiences through digital analog signals. However, with changing times, audiences have placed higher demands on broadcast program quality, and the drawbacks of traditional digital analog signal transmission have become increasingly apparent. Once external conditions change, potential influencing factors may adversely affect digital analog signal transmission. To avoid such problems, technicians must spend considerable time and effort strengthening signal debugging to ensure stable digital analog signal conversion and output.

As is well known, more than half of radio and television programs are broadcast in recorded form, which makes broadcast programs exhibit obvious lag characteristics [5]. The optimization and improvement of multimedia computer technology can replace slightly flawed analog signals with digital signals, which not only improves signal transmission efficiency but also ensures information presentation quality. This enables the formation of more complete digital television information systems that meet users' increasingly high information demands.

## 2.2 Application of Multimedia Computer Technology in Radio and Television Operation Computing

Under the guidance of multimedia computer technology, both storage technology and structural systems are continuously upgrading, driving progress in radio and television engineering. In today' s fast-paced lifestyle, audience information acquisition needs have changed significantly, with audiences preferring to use fragmented time to access desired content and enrich their entertainment lives through diversified forms. Traditional radio and television engineering cannot meet these expectations. Flexibly integrating multimedia computer technology in various forms into radio and television engineering provides more possibilities for innovation and optimization, thereby broadening development fields and opening new functions. Computer network technology has the capability to actively meet the development needs of radio and television engineering, and technicians can ensure signal transmission reliability and information security

through appropriate programming. Additionally, the application of computer network technology reduces the cost of subsequent maintenance and upgrades for radio and television engineering, enabling technical personnel to more easily complete data collection and organization tasks and use multimedia computer technology for classified storage. Future applications of multimedia computer technology in radio and television engineering will also require greater attention to optimizing storage functions to establish a stable technical foundation for broadcasting development.

## 2.3 Application of Multimedia Computer Technology in Radio and Television Network Engineering

Traditional radio and television programs primarily adopted one-way output, which limited audience choice space. In the context of media convergence, radio and television engineering has absorbed the advantages of multimedia computer technology, promptly converting analog signals to digital signals and integrating theories of signal interaction and network platform allocation. This provides audiences with greater convenience in information access and subtly changes people' s work and lifestyle patterns. Technological development is a process of accumulated progress. The digital media platform built around radio and television engineering has achieved greater optimization and upgrading of technical systems, replacing the previously lagging narrowband internet multimedia with more practical large-volume data exchange platforms. As of now, lag issues have almost disappeared from radio and television engineering. With the help of network platforms, transmission efficiency and quality have significantly improved, coverage has expanded, and cross-boundary integration has gradually emerged. Network engineering technology has exerted a strong leading role in media network development, achieving functional improvements while fully ensuring signal transmission quality. On media network platforms, network engineering technology can better meet signal transmission needs and provide sufficient support for developing new businesses, thereby breaking through the limitations of middleware structural models, expanding distributed systems around new network middleware, and effectively promoting steady progress in radio and television engineering in a convergent direction.

## 2.4 Application of Multimedia Computer Technology in Radio and Television Post-Production

Exploration and research into the functional uses of computer technology have never ceased. An increasing number of new technology types, methods, and contents have been widely applied in radio and television engineering. Multimedia computer technology has gradually shifted away from the one-sided development thinking that overly focused on signal transmission efficiency, instead paying more attention to transmission performance, striving to improve system operational usability, optimizing the expandability and environmental friendliness of radio and television engineering, and increasing the utilization

rate of technical cost development resources. Practical computer technology has been increasingly applied in radio and television engineering, creating more favorable technical conditions for post-production work [6].

Typically, post-production directly determines the presentation quality of radio and television programs. Many clever editing techniques, decorative fonts, simultaneous sounds, and soundtrack music in post-production not only enrich information transmission forms but also improve overall program quality. In recent years, technical personnel have increasingly emphasized post-production as the final quality control stage, fundamentally eliminating broadcast accidents by improving post-production quality and strengthening review processes. The widespread application of multimedia computer technology has reduced the difficulty of post-production work, enabling technicians to use flexible, varied methods and simple, efficient production forms for secondary creation of broadcast materials, thereby improving program quality and demonstrating innovation. Traditional radio program post-production mainly involved coordinating live audio, host narration, and background music, while traditional television programs focused on capturing live footage with simultaneous sound or other audio to enhance program interest. Against the backdrop of rapid computer technology development, digital nonlinear technology has also become a commonly used technique in post-production. Technicians no longer need to repeatedly watch, listen to, and screen materials to obtain valuable program content. Instead, they can input available materials into editing systems and use subsequent processing technologies such as 3D technology to enhance programs and improve overall quality.

In summary, the application of multimedia computer technology in radio and television engineering holds positive significance for both the development of computer technology and the broadcasting engineering field. Technical research and development integration over the past long period has achieved remarkable results. From a sustainable development perspective, it is necessary not only to deeply understand the necessity of integrated development but also to actively discover problems in the application and development process of radio and television engineering and explore more favorable methods for integrating multimedia computer technology. Beyond basic radio and television media engineering, multimedia computer technology can also be applied in broadcast operation computing, broadcast network engineering, and post-production program production, changing the stereotypical impression of radio and television engineering among audiences and enabling broadcasting to deliver a high-score report card to the public in the era of media convergence.

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