

Reflections on the Development and Application of Digital Television Broadcasting Technology (Postprint)

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Abstract

In recent years, with the development of China's economy and the continuous advancement and application of science and technology, China's television broadcasting industry has achieved substantial development, establishing a platform for the public to access news and information. In this context, relevant Chinese authorities have strengthened the research, development, and promotion of digital radio and television technology. Currently, China's digital television primarily utilizes communication methods such as satellite, digital microwave, and optical fiber for television signal transmission during its development process, providing high-quality television services to the public. Based on this, this paper analyzes and discusses the development and application of digital television broadcasting technology.

Full Text

Preamble

Abstract: In recent years, with China's economic development and continuous advancement in science and technology, the country's television broadcasting industry has achieved substantial progress, establishing a platform for citizens to access news and information. Against this backdrop, relevant authorities have intensified research, development, and promotion of digital broadcast television technology. Currently, China's digital television primarily relies on communication methods including satellite, digital microwave, and fiber optics for signal transmission, providing high-quality television services to the public. This paper analyzes and discusses the development and application of digital television broadcast technology based on this context.

Keywords: digital television; broadcast technology; development and application

Development and Characteristics of Digital TV Broadcast Technology

With scientific and technological advancement, China's broadcasting departments have gradually adopted digital microwave, satellite, and fiber optic transmission technologies for television signal propagation, thereby promoting the development of digital television. In recent years, digital television broadcast technology has gained public favor due to its low cost and stable signal transmission, becoming widely integrated into daily life. Furthermore, digital television broadcast systems feature cellular single-frequency network capabilities that enhance spectrum utilization efficiency and enable citizens to access information quickly and conveniently. The 普及 of digital television broadcast technology represents an inevitable trend in the development of China's television broadcasting industry.

As a modern digital television technology, digital TV employs quantization, sampling, and encoding conversion methods to transform traditional analog signals into binary digital signals for processing, transmission, and storage. To ensure security and stability during signal transmission, relevant departments have implemented computer information technology for real-time monitoring and control. Currently, China's digital electronic signal transmission utilizes three primary methods: satellite digital television, ground wireless television, and cable digital television, with mobile television demonstrating the highest usage and 普及 rates.

Digital terrestrial broadcast technology offers robust portable and mobile reception capabilities. Characterized by low cost, easy implementation, and minimal external interference, it has attracted significant attention and adoption in the television broadcasting field. To expand digital television signal coverage, relevant departments utilize high-position antennas at television stations to transmit radio waves, enabling residents to receive programs through antenna devices. Regarding the schematic diagram of digital TV signal reception, the author provides a summary illustration.

Figure 1 [Figure 1: see original paper] Schematic diagram of digital TV signal reception

Digital broadcast television technology transmits signals via digital microwave, satellite, and fiber optics, bearing the responsibility of providing entertainment and education to audiences. Consequently, it exhibits strong reliability, universality, and anti-destructive capability. Moreover, the technology effectively breaks the constraints of traditional television technology and overcomes temporal and spatial limitations, allowing audiences to watch programs anytime and anywhere with considerable flexibility. Additionally, digital television technology has significantly improved the utilization efficiency of wireless spectrum resources in China, thereby expanding digital television broadcast service domains and enabling relevant organizations to achieve greater economic benefits and social value.

China's digital broadcast television technology primarily employs binary methods for signal transmission and identification, resulting in minimal amplitude fluctuation and strong stability during signal propagation. Furthermore, the integration of internet and network information technology with digital television broadcast technology has facilitated automatic equipment control and adjustment, enhancing operational efficiency. Finally, digital television broadcast technology demonstrates strong scalability, interoperability, and extensibility, thereby improving the security and stability of communication channels during operation.

Applications of Digital TV Broadcast Technology

As the presentation carrier of digital television broadcast technology development, ground digital television manifests in various forms based on different signal reception methods. Currently, China's most commonly used digital television broadcast technologies fall into two main categories: fixed reception and mobile reception. Fixed reception utilizes stationary antennas to receive television signals, displaying them through television screens and audio systems—this represents the most common type used by Chinese households. Mobile reception, made possible by computer information technology, primarily manifests in two practical applications: mobile phone television and vehicle-mounted television.

Fixed Reception Television

Television stations typically transmit encrypted television signals via high-position antennas. To access programming services, users must pay to obtain authorization and employ digital set-top boxes to receive, decrypt, and play the signals. These set-top boxes contain smart cards that effectively prevent unauthorized access to television programs. Overall, this digital television broadcast technology facilitates pay-per-program (or channel) implementation.

Mobile Phone Television

In recent years, China's computer network information technology has developed rapidly, promoting the rise of digital mobile communication systems and driving human society toward mobility. With the emergence and development of smartphones and tablets, China's broadcasting departments have intensified research and development of mobile phone television, advancing the broadcasting industry and generating relevant benefits.

Mobile phone television development involves two categories: smartphones and non-smartphones. For smartphone-based television, development focuses on streaming video functionality and operating system integration. For non-smartphone implementations, HTTP/RTSP technology development and application are emphasized. Overall, mobile phone television functionality fundamentally breaks temporal and spatial constraints on programming,

enabling users to watch their favorite shows anytime and anywhere. While providing convenience to people's lives, mobile phone television also generates higher economic returns for relevant organizations.

Vehicle-Mounted Television

Mobile television refers collectively to television viewing in motion. As one manifestation of mobile television, vehicle-mounted mobile television enables vehicles traveling at speeds below 120 kilometers per hour to stably receive digital television signals and display them through onboard screens.

Conclusion

In recent years, with the development of China's digital television broadcast technology and its integration with internet and network information technologies, the nation's television broadcasting industry has achieved substantial progress, yielding both economic and social benefits. This paper has analyzed the overview (transmission types) and characteristics (stability, reliability, etc.) of digital television broadcast technology, elaborated on its applications (fixed television, mobile phone television, and vehicle-mounted television), and examined its development trends. The author believes that with continued development and integration with relevant technologies, digital television broadcast technology will ultimately promote the advancement of China's television industry, provide high-quality programming to the public, and facilitate the international promotion of Chinese television programs, thereby generating economic profits and social benefits.

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

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