Application of Computer Intelligent Control Technology in Broadcasting Equipment (Post-print)

Authors: Kuang Heng

Date: 2023-10-08T00:00:00+00:00

Abstract

With the comprehensive and sustainable development of computer technology, its practical application domains and scope have expanded accordingly. Broadcasting and television engineering has similarly intensified its innovation and improvement efforts, fully leveraging computer technology to further enhance the quality and speed of broadcasting and television signal transmission. This has also laid a solid foundation for improving post-production editing quality and efficiency, thereby ensuring more convenient technical operations in broadcasting and television engineering. Based on this, this article takes computer intelligent control technology as a key research focus, expounding upon its practical applications in broadcasting and television equipment, with the aim of providing valuable insights for readers.

Full Text

Computer Intelligent Control Technology in Broadcasting and Television Equipment

Abstract

With the comprehensive and sustainable development of computer technology, its practical application domains and scope have expanded significantly. Broadcasting and television engineering has likewise intensified its innovation efforts. Leveraging computer technology has further enhanced the quality and speed of broadcast signal transmission, while also laying a solid foundation for improving post-production editing quality and efficiency, thereby ensuring more convenient technical operations in broadcasting and television engineering. Accordingly, this article focuses on computer intelligent control technology as its primary research subject, elaborating on its practical applications in broadcasting and television equipment.

Keywords: computer intelligent control technology; broadcasting and television equipment; application; analysis

Chinese Library Classification: G212
Document Code: A
Article ID: 1671-0134(2017)12-056-02
DOI: 10.19483/j.cnki.11-4653/n.2017.12.016
Author: Kuang Heng

At the present stage, common broadcasting and television wireless transmitter stations rely on manual meter reading and manual timed equipment inspection. To better avoid human operation errors and ensure broadcast safety, it is necessary to employ computers for strict monitoring and management of transmission and broadcasting system equipment. Based on the widespread application of computers, the trend toward intelligent and automated development of broadcasting and television transmission equipment has become more pronounced, enabling automatic recording of equipment data. Thus, in-depth research and analysis of computer intelligent control technology applications in broadcasting and television equipment holds significant practical relevance.

1. Overview of Computer Intelligent Control Systems

Computer intelligent control systems represent an optimized integration of intelligent control technology. Employing advanced computational methods and processing techniques, they enable controlled objects to operate dynamically according to specific requirements, establishing a solid foundation for achieving control, operation, and management objectives. During system operation, sensor devices play a fundamental role. Different types of sensors can effectively collect information on physical variables such as temperature and pressure, converting this information into electrical signals that computer monitoring systems can recognize. After secondary conversion, this data is presented to users through various means such as numbers and graphics. Relevant data information is organically integrated through storage units, and in-depth analysis yields data reports that generate output signals to satisfy control objectives. Figure 1 illustrates the system framework.

[Figure 1: see original paper]

As shown in [Figure 1: see original paper], sensors collect data from monitored objects and transmit it to the "detection/execution" module. This module then inputs the data into the hardware layer through the OI interface. After analysis and processing, data output is achieved and fed back to the monitored object through the OI interface and "detection/execution" layer, ultimately realizing control objectives. It should be noted that computer intelligent control systems exhibit different categories when operating in different environments:

First, the **ODC system**. The system's most fundamental task is to collect and process relevant data information, display it in appropriate forms, and store

it. The proper utilization of this system does not affect equipment operation, providing users with more intuitive data information.

Second, the **DSC system**. This system's primary function is centralized operation and decentralized control, ensuring hierarchical management of equipment at different levels. During application, this system guarantees mutual collaboration among subsystems to form a complete system.

Third, the **DDC system**. Under normal conditions, the system can operate online in real-time, implementing real-time control after data collection, with relatively broad practical application areas.

Fourth, the **SCC system**. This system conducts comprehensive analysis of working conditions and data models, calculates optimal setpoints, and effectively executes corresponding instructions to meet control requirements.

Fifth, the **FCS system**. This system features an entirely new control structure, specifically a two-layer architecture that nevertheless provides three-layer structure functionality, thereby reducing construction costs.

2. Current Status of Computer Technology in Broadcasting and Television

Against the backdrop of rapid network technology development, research on virtual display technology has gradually shifted toward distributed virtual environments, with four primary objectives: improving information model construction efficiency, perfecting information model representation methods, enhancing user realism and participation, and refining interaction channels across various pathways. The most important goal of in-depth analysis of scientific computing visualization is to provide perceptible and easily publishable computer technologies for existing problems. However, for current digital media understanding technology, meeting human perception and cognitive needs still requires considerable time. Thus, the key issue in multimedia analysis and understanding is effectively bridging high-level semantics and low-level features of multimedia data.

3. Practical Applications of Computer Technology in Broadcasting and Television Equipment

3.1 Operational Computing

Based on the comprehensive and sustainable development of computer technology, in-depth research into emerging technologies enables comprehensive optimization of storage technology and architecture. Computer technology itself has developed extensively, and the emergence of new technologies will replace original inefficient ones. Consequently, future computer technology will become more convenient, energy-efficient, and effective, enabling substantial progress in high-performance computing. The main factors influencing this development

include the low practicality of simple, low-cost components within construction mechanisms. During research into high-performance computers, practical application domains continue to expand with significantly updated functions. These effective improvements in computer technology have provided broadcasting and television equipment with higher-level storage technology and computational capabilities.

3.2 Media Networks

New networks built on integration create more convenient digital application platforms for users, effectively resolving issues where traditional broadband cannot flexibly utilize multimedia and data conversion is restricted. Meanwhile, through simple operations, network users' demands for functions and signals continue to improve, further driving the development of broadcasting and television technology to better achieve business compatibility goals. In new networks, breakthroughs in middleware basic theory transcend the constraints of original middleware structures and patterns, actively constructing middleware central platforms and developing specific solutions and forms for new middleware technology distributed systems, thereby providing more reliable theoretical and technical support for internet distributed computing. The most obvious attribute of digital media access networks is heterogeneity. By integrating cable television networks and internet access devices, differences in their attributes are organically combined. Through comprehensive integration of audio, image, video information, and data information, the transmission technology achievements of the internet and cable television networks are effectively fused, further demonstrating the epoch-making significance and application value of information-based media networks. Traditional telecommunications networks primarily rely on analog frequencies as their important foundation, belonging to one-way distribution theoretical networks. From a technological development perspective, computer networks based on switching group theory, accompanied by comprehensive technological development and the formation of broadband digital platforms, will effectively improve defects existing in traditional network environments. Based on the integration of internet technology and cable television, broadcasting and television engineering projects have a more direct impact on people's daily lives and production methods.

3.3 Post-Production

The production of broadcasting and television programs involves numerous stages, with post-production being the final phase before program broadcast. Therefore, production quality directly affects broadcasting and television program quality. Under these circumstances, broadcasting and television impose stricter requirements on post-production. Introducing computer technology can effectively simplify the difficulty of post-production for broadcasting and television programs, achieving comprehensive improvement in production quality. Traditional broadcasting and television program production typically relies

on manual operation of recording cameras, involving enormous workloads that severely affect actual work efficiency. Through flexible application of computer technology, progress in broadcasting and television post-production technology has been promoted, enabling more rational utilization of computer digital non-linear technology. This allows post-production staff to simply place materials into computer software, simplifying workflows and delivering noticeable results. In computer digital non-linear technology, numerous types of editors can be reasonably used in post-production. For post-production editing and creation, computer graphic technology and 3D technology can also be employed to enhance the three-dimensional effect of video and audio production. Additionally, the application of Premiere video editing software has improved editing quality and efficiency while effectively saving editing costs.

In summary, introducing computer intelligent control technology into broadcasting and television equipment monitoring provides necessary support for broadcasting and television program production, ensuring more systematic and comprehensive control processes and laying a solid foundation for improving monitoring quality and efficiency. It is precisely with the strong support of intelligent control technology that the development prospects for China's broadcasting and television industry become more promising.

References

[1] Huang Meng. Analysis of Computer Intelligent Control Technology Applications in Broadcasting and Television Equipment [J]. Digital Technology and Application, 2014(6): 20-20.
[2] Jia Peirong, Zhang Ping. Computer Intelligent Control Technology Applications in Broadcasting and Television Equipment [J]. Western Radio and Television, 2015(8): 163.
[3] Zhang Lichen. Computer Intelligent Control Technology Applications in Broadcasting and Television Equipment [J]. Electronic World, 2014(7): 77-77.
[4] Wang Lijun. Application of Computer Intelligent Control Technology in Broadcasting and Television Equipment [J]. Western Radio and Television, 2015(22): 198.
[5] Huang Yifei. Application of Computer Intelligent Control Technology in News Broadcasting Equipment [J]. China New Communications, 2016, 18(21): 110.
[6] Lu Zhiyong. Current Status and Improvement of the Monitoring System at Longyan National Radio and Television Transmission Station [J]. Digital Technology and Application, 2012(7): 3-4.

(Author's Affiliation: Baishan Television Relay Station)

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