

广播与电视技术



Radio & TV Broadcast Engineering

全国百种重点期刊 专业核心科技期刊

第50卷 第2期 VOL.50 NO.2

ABP

国家广播电视总局广播电视规划院
Academy of Broadcasting Planning, NRTA

中国视听科技融媒

广播与电视技术
Radio & TV Broadcast Engineering

广电猎酷
LIEKU.CN

影视制作
Audio & Video Production

打造视听科技创新生态

广告

ISSN 1002-4522



9 771002 452234

国家广播电视总局 主管
国家广播电视总局广播电视规划院 主办



主管: 国家广播电视总局
主办: 国家广播电视总局广播电视规划院

邮发代号: 82-464

全国百种重点期刊 专业核心科技期刊

目次

tougao.lieku.cn



发行部直订 杂志铺订阅

2023年 | 第50卷 | 第2期

特别报道

10 2022年中国广电视听十大科技关键词

中国视听大数据(CVB)专栏·技术

14 收视大数据直播、时移、回看、点播综合统计方法研究

郑冠雯, 王志豪, 胡晔宸

热点·论点

网络视听节目监测监管

19 融媒体时代网络视听节目大数据监管平台设计

司凯威

24 广电行业网站视听节目监测系统设计

李军

30 网络视听节目舆情监管系统设计实现与应用

孙飞

内容制播

34 基于IP公网的融合媒体直播的探索与实践

林凡

39 基于视频增强技术的超高清图像质量增强效果测评研究

曹凯, 徐超, 王红胜, 康建华

44 融媒体时代广播中心制播系统的建设实践

王雄峰

48 Wi-Fi 6无线局域网通信技术在广播电视台节目生产基地的应用研究

丁勋

54 分布式集群存储架构在电视台非编网中的应用

许伟民

59 广播电视台4K超高清播出系统设计与实现

李良

传输覆盖

有线网络

64 基于广电网络的移动智能终端定向传输互动电视服务系统的设计与实现

范晔, 高海营, 房兰涛, 韩昭瑞, 胡芳林



主管: 国家广播电视总局
主办: 国家广播电视总局广播电视规划院

邮发代号: 82-464

全国百种重点期刊 专业核心科技期刊

目次

tougao.lieku.cn



发行部直订 杂志铺订阅

2023年 | 第50卷 | 第2期

69	基于有状态DHCPv6的机顶盒IPv6地址分配系统实现	陈起, 冒海波, 陈厚富, 王琦
73	广播电视网络日志完整性验证方案的设计与实现	闫文肖, 张瑞, 张蕾
无线覆盖		
76	地面IP光纤网组网技术在DTMB工程实施中的应用	梁哲钧
80	基于开路信号的地市级广播电视节目备份研究	王松
84	反射相控式大功率射频开关的原理和应用	王英涛, 王轶冬
88	短波广播智能配频技术分析	苏玉忠
92	中波桅杆综合检测与安全评估方法的研究与应用	陈才, 凌晨博, 陈博洋
卫星传输		
97	大型体育赛事国际公用信号卫星传输系统设计与实践	姜伟, 张斯炜
102	广播电视卫星地球站IP化改造后的信号路由优化方案设计	黄钦越
安全播出与监测监管		
106	融合媒体环境下5G核心网全流量安全检测分析系统的设计与实现	黄振川
113	电视播出系统网络安全等级保护体系的设计与应用	曾利华
118	基于声谱图的广播信号可视化监测研究	赵翠
122	广播电台播出矩阵控制软件的设计	杨光焰
广告索引 P128		



主管: 国家广播电视总局

主办: 国家广播电视总局广播电视规划院

《广播与电视技术》是由国家广播电视总局主管,国家广播电视总局广播电视规划院主办,《广播与电视技术》编辑部编辑出版的国家级技术期刊,是发布广播电视科技政策,反映事业建设成就,介绍高新技术,交流工作经验,传播各种信息的重要媒体。本刊主要面向各级广播电视行业主管部门、各级广播电视台及融媒体中心、网络公司、发射台、微波站、卫星站、节目制作单位及电教系统,同时对企业、工矿、学校、部队等具有公共广播电视设施的管理人员、技术人员也有参考价值。

为繁荣学术交流,本刊已加入《中国学术期刊网络出版总库》、“万方数据”和“维普中文科技期刊数据库”,有权选取部分论文在本刊关联平台(如广电猎酷网 www.lieku.cn、“广电猎酷”微信公众号等)发布,作者著作权使用费已随论文稿酬一次性给付。本刊充分尊重作者的原创成果并合理保护作者享有的权利,如作者不同意本刊之外其他形式的发布,请在来稿中声明,本刊将作适当处理。本刊及主办单位对本刊已发布作品的内容和观点不持有任何立场、不做任何承诺或保证、不承担任何责任。

导读

全国百种重点期刊 专业核心科技期刊
投稿平台 tougao.lieku.cn



发行部直订 杂志铺订阅

2023年 | 第50卷 | 第2期

【19】 融媒体时代网络视听节目大数据监管平台设计

近年来,网络视听节目发展迅速,传播范围和覆盖人群不断扩大,传播力和影响力不断增强,呈现出数据量大、数据类型多、增长速度快、价值大等特点。本文基于分布式采集、存储、计算等技术,设计了分布式的网络视听节目数据采集、存储、处理、服务和应用解决方案,可实现对网络视听节目的舆情感知、预警上报、内容研判辅助、传播情况分析、传播规律研究等功能,有助于提升网络视听节目监管能力。

【39】 基于视频增强技术的超高清图像质量增强效果测评研究

伴随着视频增强技术的发展,应用视频增强技术后的超高清图像质量是否达到相关技术标准,以及怎样科学合理地测评其增强效果日益成为值得研究的课题。本文正是围绕相关问题,运用超高清图像质量的主客观评价及指标测量方法,对一种视频增强技术系统的分辨率、亮度和色彩等特征开展超高清图像质量增强效果的测评研究,相关的结论和建议可供参考。

【69】 基于有状态DHCPv6的机顶盒IPv6地址分配系统实现

当前,广电网络IPv6部署稳步推进。对于有线网络运营商而言,实现机顶盒的IPv6化是推进广电网络IPv6化规模部署的重要内容。本文通过构建有状态DHCPv6系统,实现了对机顶盒的IPv6地址信息及其他网络参数信息的分配,以及对机顶盒IPv6地址的统一管理,相关做法可资业界同仁参考借鉴。

【76】 地面IP光纤网组网技术在DTMB工程实施中的应用

在四川省中央广播电视节目无线数字化覆盖工程建设过程中,原计划其中29个发射台站利用新建微波传输链路实现发射台站之间的节目传输。但经过调研勘察发现,大部分微波台站受地理地形条件、恶劣天气影响,新建微波传输网建设成本高、施工难度大、工期长。采用地面IP光纤网可充分利用已有广电光纤资源,并可快速地搭建满足各发射台站传输建设环境,能够有效解决所涉的29个地面发射台站的单频网组网要求。本文介绍了基于地面IP光纤组网的单频网技术方案,可供同行借鉴。



Competent Authority:
National Radio and Television Administration
Sponsor: Academy of Broadcasting Planning, NRTA

Publisher: Editorial Department of RTBE

Chief Editor: He Jianhui

Deputy Chief Editors: Lu Qun

Editors: Fang Lei Li Dan

Circulation Coordinator: Hu Nan

Art Editor: Zhang Yunfeng

Tel: (86-10) 86093619 (Author service) (86-10) 86092040 (Reader service)

Web Address: tougao.lieku.cn

Address: P.O.Box 2116, Beijing, P.R.China

Post Code: 100866

Postal Distributing: Code 82-464

General agent of operation: Beijing China Broadcasting Media Co., Ltd.

Marketing: Licong(18518221868) E-mail:licong@tvoao.com

Journal Number: ISSN 1002-4522 / CN11-1659/TN

Prices: RMB 20 for one copy (in China)

USD 20 for one copy (outside China)

Contents

One of Hundred National Key Periodicals
A Core Professional Sci-Tech Periodical
tougao.lieku.cn

Feb 2023 No.2

Special Reports

10 2022 Top Ten SciTech Keywords of China Radio, TV and Network Audio & Visual

CVB Column • Technology

14 Research on Comprehensive Statistical Methods for Live, Time-shifted, Playback and On-demand Viewing Big Data By Zheng Guanwen, Wang Zhihao, Hu Weichen

Monitoring and Supervision of Network Audio-visual Programs

19 Design of Big Data Supervision Platform for Network Audio-visual Programs in the Era of Converged Media By Si Kaiwei

24 Design of Audio-visual Program Monitoring System for Radio and Television Industry Website By Li Jun

30 Design, Implementation and Application of Public Opinion Supervision System for Network Audio-visual Programs By Sun Fei

Content Production & Broadcasting

34 Exploration and Practice of Converged Media Live Broadcasting Based on IP Public Network By Lin Fan

39 Evaluation and Research on Ultra HD Image Quality Enhancement Effect for Video Enhancement Technology By Cao Kai, Xu Chao, Wang Hongsheng, Kang Jianhua

44 Construction Practice of the Broadcasting Center System in the Converged Media Era By Wang Xiongfeng

48 Application of Wi-Fi 6 WLAN Communication Technology in the Production Center of Radio and Television Station By Ding Xun

54 Application of Distributed Cluster Storage Architecture in Non-linearity Editing Network of TV Station By Xu Weimin

59 Design and Implementation of 4K UHD Broadcasting System in Radio and Television Station By Li Liang

CATV

64 Design and Implementation of Directional Transmission Interactive TV Service System for Mobile Intelligent Terminal Based on Radio and Television Network By Fan Ye, Gao Haiying, Fang Lantao, Han Zhaorui, Hu Fanglin

69 Implementation of the STB IPv6 Distribution System Based on Stateful DHCPv6 By Chen Qi, Mao Haibo, Chen Houfu, Wang Qi

73 Design and Implementation of Log Integrity Verification Scheme in Radio and Television Network By Yan Wenxiao, Zhang Rui, Zhang Lei

Wireless Coverage

76 Application of Terrestrial IP Optical Fiber Network Technology in DTMB Project By Liang Zhejun

80 Research on Backup of Prefecture-level Broadcasting Program Based on Open-circuit Signal By Wang Song

84 Principle and Application of Reflective Phase-control High-power RF Switch By Wang Yingtao, Wang Yidong

88 Analysis of Shortwave Broadcasting Intelligent Frequency Allocation Technology By Su Yuzhong

92 Research and Application of Comprehensive Inspection and Safety Evaluation Method for a Medium Wave Mast By Chen Cai, Ling Chenbo, Chen Boyang

Satellite Transmission

97 Design and Practice of International Public Signal Satellite Design and Practice of International Public Signal Satellite Transmission System for Comprehensive Sports Events By Jiang Wei, Zhang Siwei

102 Design of Signal Routing Optimization Scheme after IP Transformation of Radio and Television Satellite Earth Station By Huang Qinyue

Safe Broadcasting & Monitoring and Supervision

106 Design and Implementation of the Full-flow Security Detection and Analysis System for 5G Core Network in Converged Media Environment By Huang Zhenchuan

113 Design and Application of Network Security Level Protection System for TV Broadcasting System By Zeng Lihua

118 Research on Broadcasting Signal Visual Monitoring Based on Spectrogram By Zhao Cui

122 Design of Broadcasting Matrix Control Software for Radio Station By Yang Guangyan



Competent Authority:
National Radio and Television Administration
Sponsor: Academy of Broadcasting Planning, NRTA

Radio & TV Broadcast Engineering (RTBE) is a state-class technical journal, approved by the General Administration of Press and Publication, PR of China, authorized by the National Radio and Television Administration (NRTA), PR of China, sponsored by Academy of Broadcasting Planning (ABP), NRTA, and published by Editorial Department of RTBE. RTBE is an important medium, that publishes scientific and technological policies in broadcasting, reports achievements in building broadcasting cause, introduces high and new technologies, exchanges work experience and spreads various information. RTBE is mainly geared to the needs of departments responsible for the work of radio & TV industry at all levels, radio & TV stations at all levels, network companies, transmitting stations, microwave stations, satellite stations, program production units and electrified education systems, as well as is of reference value to managerial and technical personnel for public radio & TV facilities in industrial and mining enterprises, educational institutions, troops and so on.

Index

One of Hundred National Key Periodicals
A Core Professional Sci-Tech Periodical
tougao.lieku.cn

Feb 2023 No.2

[19] Design of Big Data Supervision Platform for Network Audio-visual Programs in the Era of Converged Media

In recent years, network audio-visual programs have developed rapidly, the scope and coverage of the programs have been expanding, and the power and influence of the programs have been increasing, showing the characteristics of large amount of data, multiple types of data, rapid growth, and great value. Based on distributed collection, storage, calculation and other technologies, this paper designs a distributed network audio-visual program data collection, storage, processing, service and application solution, which can realize the functions of public opinion perception, early warning and reporting, content research and judgment assistance, transmission analysis, and transmission law research of network audio-visual programs, and help improve the network audio-visual program supervision ability.

[39] Evaluation and Research on Ultra HD Image Quality Enhancement Effect for Video Enhancement Technology

With the development of video enhancement technology, whether the quality of UHD image after the application of video enhancement technology meets the relevant technical standards, and how to scientifically and reasonably evaluate its enhancement effect has increasingly become a subject worthy to be studied. This paper focuses on the relevant issues and uses the subjective and objective evaluation and index measurement methods of the quality of UHD image to carry out the evaluation and research of the quality enhancement effect of UHD image on the resolution, brightness and color of a video enhancement technology system. The relevant conclusions and suggestions are available for reference.

[69] Implementation of the STB IPv6 Distribution System Based on Stateful DHCPv6

At present, the deployment of radio and television network IPv6 is steadily advancing. For cable network operators, IPv6 of STB is an important part of promoting IPv6 scale deployment of radio and television networks. By constructing a stateful DHCPv6 system, this paper realizes the distribution of IPv6 address information and other network parameter information of the STB, as well as the unified management of the IPv6 address of the STB. The relevant practices can be used for reference by industry colleagues.

[76] Application of Terrestrial IP Optical Fiber Network Technology in DTMB Project

During the construction of the wireless digital coverage project of Sichuan central radio and TV programs, the original plan was to use the newly built microwave transmission link to realize the program transmission between the transmission stations. However, after investigation and survey, it is found that most of the microwave stations are affected by geographical and topographical conditions and bad weather, and the construction cost of the new microwave transmission network is high, the construction difficulty is large, and the construction period is long. The use of terrestrial IP optical fiber network can make full use of the existing radio and television optical fiber resources, and can quickly build a transmission and construction environment to meet the requirements of the 29 terrestrial transmission stations, and can effectively solve the single-frequency network requirements. This paper introduces the single frequency network technology scheme based on terrestrial IP optical fiber networking, which can be used for reference by peers.