2024 IEEE International Symposium on Broadband Multimedia Systems and **Broadcasting (BMSB 2024)**

Toronto, Ontario, Canada 19-21 June 2024



IEEE Catalog Number: CFP24BRO-POD ISBN:

979-8-3503-6427-9

Copyright © 2024 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP24BRO-POD

 ISBN (Print-On-Demand):
 979-8-3503-6427-9

 ISBN (Online):
 979-8-3503-6426-2

ISSN: 2155-5044

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400

Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



Table of Contents

Wednesday AM1: Edge Computing, Smart Grid, and Energe Efficient Devices	
Q-Learning Based Computation Offloading with Minimizing the Cost in Vehicle Edge Computing	1
DRL-Based Partial Task Offloading for Multiple Vehicles in VEC Networks	7
Multi-Agent Deep Reinforcement Learning Based on Actor-Critic for Task Offloading Bingxin Wang, Xueqi Yuan and Yuqing Chai	13
Energy-efficient low-power wake-up signal and receiver mechanism	19
A User Requirement Feature Similarity-Based Computing Power Resource Matching Method and System	25
Wednesday AM2: Blockchain and Network Security	
Researching on Quantum Secure Communication based on Blockchain	30
Research on New Media Digital Copyright Registration and Trading Based on Blockchain Jinghan Wang, Qiuhong Zheng and Yun Shen	36
Research on Malicious Network Traffic Communication Based on Blockchain	42
A Blockchain_based Security Protection Scheme of Computing Force Network Lei Xu, Xiaoyu Ye, Cuicui Wang and Yu Fu	47
Research on Multi-level Trustworthy Multimedia Data Broadcasting Network Based on Blockchain Oracles	49
Wednesday AM3: Computer Vision, 3D and AR/VR	
Research on XR Standard and Key Technologies	54
System Design and Research on Traffic Tunnel Inspection System Based on Computer Vision and Audition	59
Vision-Guided Intelligent Palletizing Robot with Improved Canny Operator for	
Workpiece Target Image Contour Extraction	N/A
Driveable 3D human reconstruction Focusing on Facial Precision Enhancement	69

Qiuhong Zheng, Jinghan Wang and Yun Shen
Wednesday Noon1: HDR and Super Resolution
Divide and Conquer: Rethinking HDR Reconstruction utilizing HSV color space
Lightweight HDR Deghosting Network with Parallel Vision Transformer
Efficient Screen Content Image Super-Resolution with Weighted Multi-Branch Convolution and Attention
Wednesday Noon2: Modulation, RF Fingerprinting and Resource Allocation
When Diffusion Meets AMR: A Multi-Channel Fused Graph Transformer for Automatic Modulation Recognition under Large CFOs and SROs
Random Matrix Theory Based Radio Frequency Fingerprinting Identification of WiFi Signal
You Jiang, Jian Xiong and Junqi Wu
NUC Optimization Design for Multi-layer Layered Division Multiplexing
Wednesday Noon3: Under Water Communications, THz, and PA Linearity
Reinforcement Learning for Path Planning in Communication-Limited Environments 115 Tianchen Zhao, Rongqun Peng and Michel Kadoch
Angle-Domain Partition Beam Pattern Based Low-Overhead THz Wideband Beam Training
Jingbo Tan and Jintao Wang Dual-Block Learning: A Frequency-Based Method for Accuracy Optimization in Wideband PA Linearization
Baitao Gong, Cen Liu, Chao Zhang, Yonglin Xue, Changyong Pan and Jun Wang
Wednesday PM1: ITCN and RIS
In-Band Full-Duplex Communications with MIMO in ATSC 3.0
Cancelling Adjacent Channel Interference for In-Band Full-Duplex Communications 137 Zhihong Hunter Hong, Yiyan Wu, Wei Li, Liang Zhang, Sungjun Ahn, Sung-Ik Park, Namho Hur, Eneko Iradier, Jon Montalban and Pablo Angueira
Improving ATSC 3.0 Channel Estimation using AI Techniques

Analysis of cross-polarization effects in TV 3.0
RIS-aided Indoor Visible Light Communication System with Spatial Modulation153 $\it Jiatong~Mi,~Jintao~Wang~and~Shiyuan~Sun$
Performance Assessment of 6G XR Applications in Realistic Urban RIS-Aided Environment
Wednesday PM2: AI in Multimedia Applications
Federated Multimedia Recommendation Systems with Privacy Protection
Edge Rendering Architecture for multiuser XR Experiences and E2E Performance Assessment
Inhar Yeregui Arrieta, Roberto Viola, Daniel Mejías, Guillermo Pacho, Jasone Astorga and Mario Montagud
Improving the Playability of Cloud Games
Federated Digital Twin Implementation Methodology to Build a Large-Scale Digital Twin System
Drug-BERT : Pre-trained Language Model Specialized for Korean Drug Crime
Fine-Tuning Optimization of Small Language Models: A Novel Graph-Theoretical Approach for Efficient Prompt Engineering
Wednesday PM3: Video Streaming and QoS
Towards Rapid Elephant Flow Dection Using Time Series Prediction for OTT Streaming . 196 Anthony Orme, Andrew Gilbert and Anthony Adeyemi-Ejeye
Edge-to-Cloud Continuum Orchestrator for Distributed Video Application
Holographic Communications and Extended Reality in 5G Private Networks: A Digital Health Scenario
EDQD: An Edge-Driven Multi-Agent DRL Solution for Improving Joint QoE in DASH-based Rich Media Content Delivery

FRADIS: A Machine Learning-based Multipath Solution for Differentiated Services in a Network Slicing-enhanced Delivery Environment
Anderson Augusto Simiscuka, Abid Yaqoob and Gabriel-Miro Muntean
Thursday AM1: Satellite Communications & Non-Terrestrial Networks
A Satellite Networking Approach Supporting Batch Ephemeris Update
Mobility Management Scheme in Integrated Satellite-Terrestrial Communication System 232 $\it Xuan~Huang~and~Peng~Chen$
A network architecture for 5G and 6G satellites integrated ProSe
Research on Space-Air-Ground Integrated Network Application
Co-existence of 5G and Meteorological Satellite Systems Using ITU-R Interference Analysis
Review of IoT NTN Core Network Enhancement Technologies
Thursday AM2: 5G High Speed Train and V2X
Research on 5G High Speed Train Coverage Enhancement Technology
Analysis of Coverage Improvement in High-speed Rail Scenarios
Interference analysis of on-board small station system on railway networks
Interference of public 5G macro base station on railway networks
Micro Repeater Solution for 5G Signal Coverage in High-speed Train
Federated Learning for V2X Communications: Opportunities and Challenges
Thursday AM3: 5G Internet of Things
RedCap Performance Analysis and Deployment Strategy Research
NB-IoT Deployment Scheme with Power and Carrier Allocation in LTE&NR Macro Base Stations

Coexistence Strategies for 5G and NB-IoT Systems: Managing and Optimizing Interference in 900MHz Band
Radio Compatibility Study of 1800MHz 5G System with Adjacent Frequency Systems 311 Lei Liu and Jie Wang
5G based Passive Internet of Things: Challenges and Potential Solutions
Cellular Backscatter Communication: Ambient IoT Technology
Thursday Noon1: 5G/6G Multicasting/Broadcasting and ITCN
User Group Policy and Resource Allocation for Downlink RSMA System
Resource Allocation in Heterogeneous ITCN
An RF Self-Interference Cancellation method for In-Band Distribution Link in ATSC 3.0.340 Hao Ju, Yin Xu, Dazhi He, Ning Yang, Haoyang Li, Wenjun Zhang and Yiyan Wu
Thursday Noon2: AI/ML and Data Scince
A Novel Multimodal Human Activity Recognition based on Self-Attention Mechanism 345 Xue Ding, Yaowen Mei, Bowen Cai, Yuetian Zhou, Jinyang Yu, Weiliang Xie and Ting Jiang
A multi-factor real-time monitoring mechanism for the "mining" behavior of blockchain networks
No-reference Quality Assessment of Text-to-Image Generation
Optimizing Data Quality in Deep Learning through Advanced Analytics
Thursday Noon3: Image Processing
Image Classification of Rice Diseases Based on Metric Learning
Detailed and Controllable Old Photo Restoration with Diffusion Priors
High Dynamic Range Imaging from RAW Domain with a New Benchmark Dataset and a Multi-scale Network
Thursday PM1: ATC 3.0. 5G Broadcast & TV 3.0 Tests

Physical layer performance comparison results of ATSC 3.0 and 5G Broadcast through laboratory and field tests
Sunhyoung Kwon, Seok-Ki Ahn, Sungho Jeon, Sesh Simha, Mark Aitken and Sung-Ik Park
Performance Evaluation of 5G Broadcast and ATSC 3.0 for Cellular Broadcasting Scenarios
Seok-Ki Ahn, Soyoung Han, Sesh Simha, Mark Aitken and Sung-Ik Park
Evaluation of ATSC 3.0 MODCODs for TV 3.0
Evaluation of the latency tolerance between OTA and OTT in multi-stream MPEG-H Audio delivery
Test Automation of the Physical Layer of TV 3.0
Thursday PM2: 5G/6G Multicasting/Broadcasting THz and PA Linearity
Exploiting the benefits of in-band D2D communications for 5G-MBS use cases
Federated Learning-based Unicast/Multicast Service Delivery over 6G O-RAN Framework 413 Claudia Carballo Gonzalez, Ernesto Fontes Pupo, Jon Montalban, Eneko Iradier, Pablo Angueira and Maurizio Murroni
Multi-rate Multicasting Over Fixed Pre-Computed MIMO Beams
A System Level Study on LDM for Mixed Broadcast-Broadband Service Delivery in 5G 425 Yu Xue, Wei Li, Yuxiao Zhai, Liang Zhang, Zhihong Hong, Elvino Sousa and Yiyan Wu
Antenna Beamforming Patterns of Multimedia Transmissions for NextG Phy-Security 431 $\it Junghwan~Kim,~Mehzabien~Iqbal~and~Ahmad~Y~Javaid$
Multi-Rate Hybrid Predistortion with Reduced Sampling Rate and Resolution for 6G Power Amplifier Linearization
Thursday PM3: AR/VR, Sensorial, Face Diffusion, & Video Coding
NSM2: Network Slice Management and Monitoring Using Machine Learning For AR/VR Applications

Mulseplayer: A Multi-Sensorial Media Content Delivery Solution to Enhance End-User Quality of Experience
Cristina Hava Muntean, Irina Tal, Diana Bogusevschi, Marilena Bratu, Ting Bi and Gabriel-Miro Muntean
Detection of Diffusion Model-Generated Faces by Assessing Smoothness and Noise Tolerance
Baoping Liu, Bo Liu, Ming Ding and Tianqing Zhu
Identity-Consistent Video De-identification via Diffusion Autoencoders
Selective Deblocking for Focused Lenslet Video Coding
Friday AM1: MIMO, RIS, Channel Model & Interference Mitigation
Performance Evaluation on Distributed Massive MIMO System for Indoor Deployments 473 Sen Xu , Shangkun $Xiong$ and Zhe $Dong$
Exploring Massive MIMO Technology Artificial Intelligence-Driven Solutions for Future Communications
A RIS Aided Channel Estimation Algorithm for MIMO System
Application of Smart Surfaces in 6G Networks and Research Advances
Research on Interference Management in Ultra-Dense Millimetre Wave Networks 494 $Pingping\ Lin$
Wireless MIMO Channel Modeling for B5G Indoor Scenarios
Friday AM2: 5G/6G Networks
Data Characteristics Descriptor Based Model Transfer Architecture in 5G Core Network 505 Menghan Yu, Pengyu Li, Yanxia Xing and Dong Wang
An enhanced QoS mechanism based on QoS decision assistant information511 Qiuyue Gao, Jinyan Li, Junli Xue and Yanxia Xing
A Model of Precise Delivery of Advertising based on Encrypted Transmission in Network . 517 Ying Wang, Yu Fu, Lei Xu and Xiaoyu Ye
Energy-Efficient Resource Allocation in LEO-assisted Open RAN architecture towards 6G 523 Qingtian Wang, Qi Wen, Jing Ling, Jiaying Zong, Yunfei Shen and Dongjie Liu
A reliable monitoring and management scheme for shared base station configuration 529 Lanfang Wu and Zhe Dong
Friday AM3: AI Applications, Compressed Sensing & Spectrum Sharing

Always-on Personal AI for 6G networks
Overview and Trend of Large-scale Model Deployment Mode
A Master Data Quality Management Platform for Telecommunication Operators 54 Xinchi Li and Xiaoqing Xia
Compressed Sensing Based DOA Estimation Algorithm Research
$5\mathrm{G}$ and future communications spectrum sharing and the evolution of the digital society 55 $Zhirong~Zhang~and~Yuqing~Chai$
Friday Noon1: Video Streaming and Smart Grid
LaEC: Loss-aware Earliest Completion Data Scheduler for Multi-site Parallel Downloading
A Priority Aware Free Viewpoint Video Transmit Scheme Based on QUIC
Electricity Price Gaming Based on Personalized Load Forecasting for Energy Saving 57 Jie Zou, Siya Xu, Cheng Zhou, Hai Wu, Zeng Zeng and Peng Yu
Real-Time Power Optimal Schedule Method for Energy Internet Based on LSTM Encoding
Friday Noon2: Unmanned Aerial Vehicle (UAV)
Research on Automatic Path Planning of Wind Turbines Inspection Based on Combined UAV
Research on Remote Resource Cooperation Strategy Based on Modular UAVs
Unmanned Aerial Vehicle Path Planning Based on Improved DDQN Algorithm
Multi-hop Diffused Graph Convolution for Resilient UAV Swarm Networks
Friday Noon3: Unmanned Aerial Vehicle (UAV)
CTU-Level Lagrange Multiplier and QP Adaption for Random Access Hierarchical Coding in VVC
Context-guided Resolution Rescaling Framework for Intra Frame Coding

LiDAR Point Cloud Compression Improvement through Sampling Operations
Friday PM1: NextGen TV & New Technologies
ATSC 3.0 In The Cloud
ATSC Core Network: Encryption Analysis and Evaluation
Standardizing Web TV: Adapting ATSC 3.0 for Use on any IP Network
Performance Evaluation of Time and Frequency Interelavers in ATSC 3.0 through laboratory and field tests
Novel Cooperative Automatic Modulation Classification Based on Received-Signal Quality
Friday PM2: PHY Transmission Technologies
DFT-Based Channel Estimation Using Adaptive Window In ATSC 3.0
Enhanced ZF and LS channel estimators for OFDM with MPSK modulation
A Joint Frequency Offset Estimation Algorithm for 5G NTN
Adaptive LDPC Decoder with Performance Prediction Based on Average Mutual Information
Friday PM3: Edge Computing, Network Traffic, & Optical Comm.
Decentralized Multi-layer Vehicular Edge Computing Framework for Time-Efficient Task Coordination
Trust and Reputation Management for Data Trading in Vehicular Edge Computing: A DRL-Based Approach
Multimedia service distribution platform in edge computing environments
Automated Hyperparameter Tuning and Ensemble Machine Learning Approach for Network Traffic Classification

Optical Wireless Communication Channel Measurement in an Industrial Environment \dots 6	96
Xiaodong Liu, Xuanbang Chen, Xun Zhang, Yuhao Wang, Bastien Bechadergue,	
Diego Dupleich, Alexander Artemenko and Andre Sus	

Additional Paper:

Automated industrial crack inspection system based on edge-edge collaboration of multiple cameras	
and programmable logic controller	01
Fujia Liu, Jing Tang, Jianhong Yang, Hongsen Wang	