Generative AI for Next-Generation Wireless and Optical Communications

The integration of generative AI techniques into wireless and optical communications has opened up new avenues for enhancing network design, optimization, and performance. With the ongoing transition to 5G/6G and the expansion of optical communication systems, AI-driven models, particularly generative techniques such as Generative Adversarial Networks (GANs) and deep reinforcement learning, are poised to revolutionize the way networks are designed, managed, and optimized. This special session focuses on how generative AI can be applied to address key challenges in wireless and optical communications, including network traffic prediction, resource allocation, interference mitigation, and performance optimization. Additionally, the session will explore how AI-driven solutions can improve the integration of wireless and optical networks to create more efficient, reliable, and scalable communication systems.

Topics of the Special Session

Topics of the Special Session include but are not limited to:

- Generative AI for traffic prediction and congestion management in wireless and optical networks
- GAN-based methods for generating synthetic data for wireless-optical network simulation and design
- AI-driven optimization of resource allocation and network topology in hybrid wireless-optical systems
- Generative models for multi-layer interference management in integrated wireless-optical networks
- Self-organizing wireless-optical networks using generative models
- AI-enabled optimization of network slicing in 5G/6G systems
- Federated learning for decentralized network optimization in wireless-optical infrastructures
- Split learning for privacy-preserving optimization in wireless and optical communication systems
- Network deployment and coverage optimization using generative techniques
- AI-based solutions for optical network fault detection and anomaly prediction
- Collaborative AI frameworks for secure and efficient wireless network management

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Planned Contributions ▶▶▶▶

1. "Collaborative Federated Learning for Efficient Multi-Tier Wireless Network Management", Tianshun Wang, Nanjing University of Posts and Telecommunications.
2. "Split Learning for Privacy-Preserving Wireless Network Optimization in Edge Computing", Yang Li, Southwest Jiaotong University.
3. "Optimal Cut Layer Selection with Privacy Protection for Split Federated Learning in Wireless Networks", Yanbing Xu, South China Normal University.
4. "Optimization of Hybrid Wireless-Optical Networks Using GANs for Resource Allocation", Jinglin Huang, Guangdong Universit of Technology.
5. "AI-Based Resource Allocation for High-Density Urban Wireless Networks", Peichun Li, University of Macau.
6. "Generative AI for Energy-Efficient Management of Wireless-Optical Networks", Guoliang Cheng, Peng Cheng Laboratory.
7. "Reinforcement Learning Approaches for Optimizing Multi-Access Edge Computing in 5G Networks", Bo Fan, Beijing Jiaotong University.
8. "MobStream: An Reinforcement-learning driven mobile streaming methodology based on Multipath QUIC", Mu Wang, Beijing University of Posts and Telecommunications.

Submission

Submission Deadline : **March 1, 2025**.

Submission Link: https://edas.info/newPaper.php?c=33162&track=130072

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Further information can be found on the conference website at: 🌐 https://www.wocc.org