Haolong Chen

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Education

The Chinese University of Hong Kong, Shenzhen, Computer and Information Engineering, *PhD* 2028.6

- **Supervisors**: Guangxu Zhu, Tsung-Hui Chang

Jinan University, Software Engineering, *Bachelor* 2023.6

- **Supervisors**: Guanghua Yang, Xinyuan Zhang

Experience

Shenzhen Research Institute of Big Data, Research Assistant 2023.5 – Now

- Research in the fields of efficient inference for LLM, efficient training for LLM, spatio-temporal data analysis, and artificial intelligence in wireless communication.

Jinan University High-Performance Computer Team, Team Member 2021.6 – 2023.5

- Participate in international high-performance computer competition ASC21, SC21.

Publications

1. **Haolong Chen**, Liang Zhang, Zhengyuan Xin, Guangxu Zhu. "STM3: Mixture of Multiscale Mamba for Long-Term Spatio-Temporal Time-Series Prediction". SIG KDD 2026 Under-Review.
2. **Haolong Chen***, Zhengyuan Xin*, Liang Zhang, Lei Xue, Guangxu Zhu. "Error-Aware Reverse Auction Mechanism for Large Language Model Routing". ICML 2026 Under-Review.
3. **Haolong Chen**, Hanzhi Chen, Zijian Zhao, Kaifeng Han, Guangxu Zhu, Yichen Zhao, Ying Du, Wei Xu, Qingjiang Shi. "An overview of domain-specific foundation model: key technologies, applications and challenges". SCIENCE CHINA Information Sciences 2026 (CCF A).
4. Zhijie Cai*, **Haolong Chen***, Guangxu Zhu. "AdaMeZO: Adam-Styled Zeroth-Order Optimizer for LLM Fine-tuning Without Memorizing the Moments". ICML 2026 Under-Review.
5. Zhijie Cai*, **Haolong Chen***, Guangxu Zhu. "FeedSign: Robust Full-parameter Federated Fine-tuning of Large Models with Extremely Low Communication Overhead of One Bit". IEEE Transactions on Mobile Computing (CCF A) Under-Review.
6. Zhijie Cai*, **Haolong Chen***, Guangxu Zhu, Qingjiang Shi, Kaibin Huang. "FeedSign: Robust and Communication-Efficient Federated Fine-tuning of Large Models for Edge AI". IEEE International Conference on Communications 2026.
7. Qizhe Li, **Haolong Chen**, Jiansheng Li, Shuqi Chai, Xuan Li, Yuzhou Hou, Xinhua Shao, Fangfang Li, Kaifeng Han, Guangxu Zhu. "DK-Root: A Joint Data-and-Knowledge-Driven Framework for Root Cause Analysis of QoE Degradations in Mobile Networks". IEEE Transactions on Networking (CCF A) Under-Review.
8. Qizhe Li, **Haolong Chen**, Siliang Fu, Ziheng Zou, Guangxu Zhu. "SemiRoot: A Semi-Supervised Deep Learning Framework for Root-Cause Analysis of QoE Degradations in Mobile Networks". IEEE International Conference on Communications Workshop Under-Review.
9. Zhijie Cai, Yuhao Zheng, **Haolong Chen**, Dongzhu Liu, Bin Wang, Guangxu Zhu. "Three Birds, One Stone: Solving the Communication-Memory-Privacy Trilemma in LLM Fine-tuning Over Wireless Networks with Zeroth-Order Optimization". IEEE Journal on Selected Areas in Communications (CCF A) Under-Review.
10. **Haolong Chen**, Hanzhi Chen, Kaifeng Han, Guangxu Zhu, Yichen Zhao, Ying Du. "Domain-Specific Foundation-Model Customization: Theoretical Foundation and Key Technology". Journal of Data Acquisition and Processing 2024.
11. Tingwei Chen, Jiayi Chen, Zijian Zhao, **Haolong Chen**, Liang Zhang, Guangxu Zhu. "First Token Probability Guided RAG for Telecom Question Answering".

Projects

Guangdong Major Project of Basic and Applied Basic Research: Research on Key Technologies of 6G Networks Enhanced by Environment | *Communication KPI Modeling*

- Charging of the sub-project on modeling and simulation of user spatiotemporal distribution and traffic flow, which is part of the larger project on spatiotemporal state modeling and simulation of network elements.

- Developed a joint spatiotemporal traffic modeling approach using multiple base stations and proposed a novel spatiotemporal traffic prediction model that integrates the Mamba long-term sequence neural network, dynamic graph convolutional network, and sparse mixture of experts.

National Key Research and Development Foundation: Learning Optimization Theory and Methods and Their Applications in 5G Networks | *Communication KPI Modeling*

- Responsible for user-side performance modeling based on spatiotemporal integration in Subproject: Performance Modeling of 5G Network Systems.
- Proposed a method for spatiotemporal user performance modeling based on a multimodal large language model, which can integrate time-series user performance data with text descriptions of the dataset and network environment information surrounding the service area to achieve high-precision prediction.

Multidimensional User Experience Modeling (Huawei - SRIBD) | *Communication KPI Modeling*

- Constructed a time-series classification model for user experience anomalies.
- Proposed a data augmentation method based on diffusion models to address the issue of overfitting due to the limited amount of labeled data.

Spectrum Efficiency Modeling with Measured MIMO Channel (Huawei - SRIBD) | *Communication KPI Modeling*

- Utilized real-world 5G MIMO measurement data from multiple grids and cells to predict record-level spectrum efficiency under multi-grid and multi-cell scenarios.

Reviewer for International Research Conferences and Journals

- WCNC 26 (TPC Member), ICC 26 (TPC Member), TMC 25, NeurIPS 25, ICASSP 24, ICC 24,25, GLOBECOM 25, ICCC 25, WCNC 24,25, PIMRC 25.

Patents

Method, Apparatus, Electronic Device, and Storage Medium for Traffic Prediction in Wireless Communication

- Inventors: **Haolong Chen**, Zhengyuan Xin, Guangxu Zhu, Assignee: Shenzhen Big Data Research Institute, Patent Number: ZL202511087894.7, Date of Authorization: 2025.10.28.

Predictive Method and Related Apparatus based on Multimodal Large Models for Communication Key Performance Index Prediction

- Inventors: **Haolong Chen**, Guangxu Zhu, Qingjiang Shi, Assignee: Shenzhen Big Data Research Institute, Patent Number: ZL202510542918.7, Date of Authorization: 2025.10.17.

Model Training Methods, Text Classification Methods, Devices, Electronic Devices, and Media

- Inventors: Zhijie Cai, **Haolong Chen**, Guangxu Zhu, Qingjiang Shi, Assignee: Shenzhen Big Data Research Institute, Patent Number: ZL2025103509755, Date of Authorization: 2025.9.16.

Communication and Memory Efficient Distributed Training Methods for Large Models and Text Classification Methods

- Inventors: Zhijie Cai, **Haolong Chen**, Guangxu Zhu, Assignee: Shenzhen Big Data Research Institute, Patent Number: ZL2025100670425, Date of Authorization: 2025.8.12.

Predictive Method, Apparatus, Electronic Device, and Storage Medium for Spectrum Efficiency

- Inventors: **Haolong Chen**, Guangxu Zhu, Qingjiang Shi, Assignee: Shenzhen Big Data Research Institute, Patent Number: ZL2023115716969, Date of Authorization: 2024.2.23.

Software Monographs

Semi-Supervised Training and Solution System for Spectral Efficiency Prediction Algorithms Based on Large-Scale User Measurement Report Data v1.0

- Assignee: Shenzhen Big Data Research Institute, Assignment Number: 2024SR1450315, Date of Authorization: 2024.9.29.

SKILLS

Programming

- Proficient in: Python, PyTorch, Linux
- Familiar with: Matlab, C/C++, MySQL, Git, Java, Web Frontend Development, Web Backend Development, TensorFlow

Languages

- English (IELTS: 6.5, CET-4: 548, CET-6: 542)
- Chinese (mother tongue)