

HONGYI LI

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Google Scholar: <https://scholar.google.com/citations?hl=en&user=UXJVS1UAAAAJ>

RESEARCH INTERESTS

Deep Learning on Graphs, Nonconvex and Distributed Optimization, Reliable and Explainable Deep Learning.

EDUCATION

Xidian University Xi'an, China	<i>Aug 2019 - Jun 2025</i>
M.Eng. in Information and Telecommunication Engineering (GPA 3.82/4.0)	
Emory University Atlanta, USA	<i>Dec 2020 - Jun 2023</i>
Visiting Student (Remote)	
Xidian University Xi'an, China	<i>Aug 2015 - Jun 2019</i>
B.Eng. in Telecommunications Engineering (Pilot Class, GPA 3.8/4.0)	

PROJECT EXPERIENCES

Model parallelism training of the GA-MLP model based on the ADMM framework

Project Co-leader, Emory University *Mar 2021 – Jul 2021*

- Split the Graph Augmented Multi-Layer Perceptron (GA-MLP) model into independent layer components by the Alternating Direction Method of Multipliers (ADMM) to achieve model parallelism.
- Conducted distributed training experiments that demonstrated effectiveness, massive speedup and communication overhead across multiple AWS agents.

Uncertainty quantification of explanations of GNNs

Formula and Model developer, Emory University *Jun 2022 – Jun 2023*

- Quantified explanation uncertainty of a Graph Neural Network (GNN) from both data and model perspectives.
- Proposed two sources of data uncertainties of the GNN explanations: measurement and structural uncertainties; and quantified them respectively.
- Quantified model uncertainty of GNN explanations through variational inference.

Mixed-parallel training of GCNs based on the ADMM framework

Project Leader, Emory University *Jun 2021 – Jan 2022*

- Proposed a distributed training algorithm based on the ADMM framework by breaking Graph Convolutional Network (GCN) layers into layerwise blocks and partitioning a graph into independent communities.
- Conducted experiments to demonstrate the performance and the speedup of the proposed algorithm.

Improved Massive MIMO Detection Using Edge GNN

Project Leader, Xidian University *Aug 2020 – Nov 2020*

- Used graph edge attributes that represented the channel correlations in the Multiple-Input Multiple-Output (MIMO) wireless communication system to measure the importance of neighboring messages for each node.
- Reduced the training time through sparsifying the complete graph model that represented the signal transmission process based on the channel correlations.

PUBLICATIONS

Journal Publications

1. Junxiang Wang, **Hongyi Li (first-coauthor)**, Zheng Chai, Yongchao Wang, Yue Cheng, and Liang Zhao. Toward Quantized Model Parallelism for Graph-Augmented MLPs Based on Gradient-Free ADMM Framework. *IEEE Transactions on Neural Networks and Learning Systems (TNNLS)*, (**Impact Factor: 10.4**), vol. 35, no. 4, pp. 4491-4501, April 2024, doi: 10.1109/TNNLS.2022.3223879.

2. Junxiang Wang, **Hongyi Li**, and Liang Zhao. Accelerated Gradient-free Neural Network Training by Multi-convex Alternating Optimization. Neurocomputing, (**Impact Factor: 5.779**), 2022, 487: 130-143, doi: 10.1016/j.neucom.2022.02.039.
3. Junji Jiang, Chen Ling, **Hongyi Li**, Guangji Bai, Xujiang Zhao, and Liang Zhao. Quantifying Uncertainty in Graph Neural Network Explanations. Frontiers in Big Data, (**Impact Factor: 3.1**), 2024, doi: 10.3389/fdata.2024.1392662.

Conference Publications

1. **Hongyi Li**, Junxiang Wang, Yongchao Wang, Yue Cheng, and Liang Zhao. Community-based Layerwise Distributed Training of Graph Convolutional Networks. NeurIPS 2021 Workshop on Optimization for Machine Learning (OPT 2021).
2. Junxiang Wang, **Hongyi Li**, Yongchao Wang, and Liang Zhao. Accelerated Gradient-free Neural Network Training by Multi-convex Alternating Optimization. Workshop on “Beyond first-order methods in ML systems” of the 38th International Conference on Machine Learning, 2021.

Preprints

1. **Hongyi Li**, Junxiang Wang, and Yongchao Wang. Improved Massive MIMO Detection Using Edge Graph Neural Network, arXiv preprint arXiv:2206.06979.

EDUCATIONAL SERVICES

- **PC Members:** Optimization for Machine Learning NeurIPS Workshop (NeurIPS OPT Workshop 2024, 2023&2022)
- **Reviewers:** ACM Computing Surveys (CSUR): 2023; Transactions on Knowledge and Data Engineering (TKDE): 2024 & 2023.
- **External Reviewers:** NeurIPS 2022&2021; KDD 2022&2021; ICDM 2022; ICLR 2022; CoLLA.
- **TA experiences:** Introduction to Electric and Electronic Engineering, 2020; Principles of Communications, 2019.

PROFESSIONAL SKILLS

- **Programming Languages:** Python (Pytorch, Tensorflow, Pytorch Geometric), MATLAB, C.
- **Cloud Computing Servers:** AWS, Google Cloud, Chameleoncloud.
- **Operating Systems:** Windows, Linux.

RELATED COURSES

- **Graduate Courses:** Neural Networks and Fuzzy Systems, Stochastic Processes, Fundamentals of Information Theory.
- **Undergraduate Courses:** Advanced Mathematics (I & II), Advanced Algebra, Selected Topics in Mathematical Statistics, Information Theory, Probability Theory and Mathematical Statistics, Introduction of Computer and C Language Program Design, Data Structure and Algorithm Analysis, Operating Systems.

HONORS, AWARDS,& EXTRACURRICULAR ACTIVITIES

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| 2019 | Valedictorian (1 out of 5527) , Xidian University. |
| 2018 | The First Prize for National English Competition (Top 0.5%) , China. |
| 2017 | The Second Prize for FLTRP National English Writing Competition for College Students (Top 0.03%) , China. |
| 2016 | China National Endeavor Scholarship (Top 5%) , Xidian University. |
| 2022 | Academic English Communication and Writing Skills Program , University of Cambridge (Online). |
| 2018 | Team Leader of Future Elite Development Program , Harvard University. |