

Guangji Bai

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Research Statement

I am a fourth-year Ph.D. student at CS Department, Emory University working with Prof. [Liang Zhao](#). I am generally interested in designing **efficient, generalizable, and explainable learning algorithms with theoretical guarantee**. I have published first-author papers in top-tier conferences such as KDD, ICLR, NeurIPS, SDM, etc. My current research topics include but are not limited to **1.** Designing learning strategies for domain transfer problems, such as multi-task learning, domain adaptation, and domain generalization. **2.** Developing large-scale optimization algorithms with better scalability and performance, such as distributed training for Graph Neural Networks (GNNs) and inference acceleration of Large Language Models (LLMs). **3.** Online continual learning with memory replay and neuro-inspiration.

Education

Emory University

Ph.D. in Computer Science

Atlanta, GA

2020.8-2025.5 (expected)

The George Washington University

M.S. in Statistics

Washington D.C.

2018.9-2020.5

Fudan University

B.S. in Mathematics

Shanghai, China

2014.9-2018.6

Internship

NEC Laboratory America

Research Intern

Princeton, NJ.

2023.5-2023.8

- Developing machine learning algorithms for domain adaptation on time series data.
- We generalize the prompt tuning techniques from NLP to time series domain and leverage the prompts to learn domain-specific and domain-invariant representation.
- Proposed method demonstrated state-of-the-art performance on various time series domain adaptation benchmarks.

Skills

- Programming: Java-intermediate, Python-proficient, PyTorch-proficient
- English-Proficiency
- Chinese – Native proficiency

Recent Projects (Preprints)

- **Inference acceleration of LLMs via global pruning:** explore gradient-free optimization methods for pruning LLMs in a global manner. Specifically, we leverage the chain of modules and auxiliary variables to achieve an adaptive global pruning of LLMs with low memory costs. The paper is currently under review of ACL 2024.
- **Resource-efficient Large Language Models (Survey):** We delve into various strategies and techniques for optimizing Large Language Models across key resources like computation, memory, energy, and financial costs. The survey highlights innovations in model architecture, training efficiency, and system design, offering insights into balancing model performance with resource constraints in AI research. The paper is currently under review.
- **Large pre-trained model with prompting for time-series domain adaptation:** We investigate how to leverage pre-trained time-series model and prompt-tuning methods to achieve better performance on time-series domain adaptation tasks. We innovatively consider leveraging soft prompts to learn the domain-invariant and -specific information. The paper is currently under review of KDD 2024.

Selected Publications

- **Guangji Bai**, Qilong Zhao, Xiaoyang Jiang, Liang Zhao. “Saliency-Guided Hidden Associative Replay for Continual Learning”. (*NeurIPS 2023@AMHN WS*)
- **Guangji Bai**, Chen Ling*, Liang Zhao. “Temporal Domain Generalization with Drift-Aware Dynamic Neural Networks”. (*ICLR 2023, Oral*).

- **Guangji Bai**, Chen Ling, Yuyang Gao, Liang Zhao. “Saliency-Augmented Memory Completion for Continual Learning.” SIAM International Conference on Data Mining (*SDM 2023*)
- **Guangji Bai**, Johnny Torres*, Junxiang Wang, Liang Zhao, Carmen Vaca, Cristina Abad. “Sign-Regularized Multi-Task Learning.” SIAM International Conference on Data Mining (*SDM 2023*)
- **Guangji Bai**, Liang Zhao. “Saliency-Regularized Deep Multi-Task Learning.” The 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (*KDD 2022*)
- Yuyang Gao, Tong Sun, **Guangji Bai**, Siyi Gu, Sungsoo Hong, Liang Zhao. “RES: A Robust Framework for Guiding Visual Explanation.” The 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (*KDD 2022*)
- Zishan Gu, Ke Zhang, **Guangji Bai**, Liang Chen, Liang Zhao, Carl Yang. “Dynamic Activation of Clients and Parameters for Federated Learning over Heterogeneous Graphs.” The 31st ACM Conference on Information and Knowledge Management (*ICDE 2023*).
- Dazhou Yu*, **Guangji Bai***, Yun Li, Liang Zhao. “Deep Spatial Domain Generalization”. The 22nd IEEE International Conference on Data Mining (*ICDM 2022*).

*Equal contribution

For a comprehensive list of my research and publication, please refer to my [Google Scholar](#) page.

Professional Services

PC member for NeurIPS (22'23'), AISTATS (23'24').

Reviewer for KDD, ICML, AAAI, ICDM, ICLR.

Awards

- ICLR 2023 oral (top 5% among accepted papers)
- SDM 2023 student travel award
- KDD 2022 student travel award
- CIKM 2022 student travel award