LECHENG KONG

Researcher ~ Engineer

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BIOGRAPHY

I am a **fifth-year** Ph.D. candidate in Computer Science at Washington University in St. Louis, advised by Dr. Yixin Chen. My research focuses on advancing **graph foundation models** by integrating Large Language Models (**LLMs**) with graph neural networks (GNNs), addressing challenges in **multi-modality alignment**, large-scale data processing, and foundational graph learning tasks. I have extensive experience in:

- LLM fine-tuning and pretraining for graph-related tasks, leveraging cutting-edge techniques to enable zero-shot and few-shot learning.
- Multi-modality alignment, designing architectures that seamlessly integrate graph structural information with LLM-based semantic understanding.
- Large-scale data preparation, creating and processing diverse datasets for foundational model pretraining and evaluation.

My recent interest is using graph foundation models to address **long-context** problems, enhancing model efficiency and scalability for tasks requiring extensive contextual understanding. Additionally, I am exploring ways to improve LLMs' reasoning abilities by leveraging graph-based approaches to better logical and structural comprehension.

EDUCATION

Washington University in St. Louis, St. Louis, MO, United States *2020.09 - Expected 2025*
Ph.D. Candidate in Computer Science
Advisor: Dr. Yixin Chen, GPA:3.87

Washington University in St. Louis, St. Louis, MO, United States *2016.09 - 2020.05*
B.S. / M.S. in Computer Science, GPA:3.84

WORK EXPERIENCE

Applied Scientist Intern, Amazon *2024.05 - 2024.08*
Conducted research on **continual graph learning**, minimizing training costs by up to 60% while maintaining high performance.
Proposed novel continual learning architecture applicable to broader context beyond graph learning with the Sparse Mixture-of-Experts approach.

Software Development Engineer Intern, Google *2019.05 - 2019.08*
Developed a pipeline supporting the Google Hotel website to produce a user data-generated tip.
Implemented an efficient map-reduce program to gather, process, and generate data sets.

SELECTED PROJECTS

Generative One-For-All model *2024.01 - Ongoing*
Designed the first GNN-LLM interleaved architecture that integrates GNNs' structural learning with LLMs' generative capabilities, enabling unified modeling of diverse graph tasks through a **graph completion framework**.
Pretrain the first large-scale graph model that demonstrates foundational properties including arbitrary input and task fluidity.
Instruction-finetune the model achieving significantly better performance than LLMs on graph tasks (up to 60%).

Mixture-of-Experts for Graph Continual Learning *2024.05 - Ongoing*
Design a novel **MoE** architecture that dynamically increments expert size to learn and maintain knowledge in the data stream.
Propose the time-guided loss that explicitly guides the training of experts for better data loading and learning, which leads to significant performance improvement (up to 20%)

Test-time compute for Graphs using Language Models *2024.08 - Ongoing*
Used LLMs to solve complex graph learning tasks without training and fine-tuning through **test time computing**.
Converted conventional language modeling tasks to graph reasoning tasks to improve model reasoning ability.

One-For-All Graph Neural Networks *2023.03 - 2023.10*
Used Large Language Models to unify different graph data.
Developed the *first graph model that works on all existing graph classification tasks*.
Proposed unique graph prompting so a single graph model solves all tasks (zero-shot, graph-level, node-level, etc.).
Demonstrate unprecedented task unification and transfer learning ability (several SOTA few-shot and supervised performances even in the unified training setting.)

Reinforcement Learning Boosted Graph Neural Networks *2022.11 - 2023.05*
Use Q-learning to discover high-impact sub-structures in graph data.
Combine Q-learning with GNN to achieve the same results as other high-performance models with only 20% runtime.
Theoretically showed the efficiency and the superiority in expressivity of the proposed method.

PUBLICATION

('' indicates equal contribution)*

Conference:

a1 **L. Kong**, J. Feng, H. Liu, C. Huang, J. Huang, Y. Chen, M. Zhang, *"GOFA: A Generative One-For-All Model for Joint Graph Language Modeling."* International Conference on Learning Representations (**ICLR**). 2025

a1 H. Liu, J. Feng, **L. Kong**, D. Tao, Y. Chen, M. Zhang, *"Graph Contrastive Learning Meets Graph Meta Learning: A Unified Method for Few-shot Node Tasks."* The Web Conference (**WWW**). 2024

a2 H. Liu*, J. Feng*, **L. Kong***, N. Liang, D. Tao, Y. Chen, M. Zhang, *"One for All: Towards Training One Graph Model for All Classification Tasks."* International Conference on Learning Representations (**ICLR Spotlight 5%**). 2024

a3 **L. Kong**, J. Feng, H. Liu, D. Tao, Y. Chen, M. Zhang, *"MAG-GNN: Reinforcement Learning Boosted Graph Neural Network."* Proc. Adv. Neural Inf. Process. Syst. (**NeurIPS**), 2023 *(To Appear)*

a4 J. Feng, **L. Kong**, H. Liu, D. Tao, F. Li, Y. Chen, M. Zhang, *"Extending the Design Space of Graph Neural Networks by Rethinking Folklore Weisfeiler-Lehman."* Proc. Adv. Neural Inf. Process. Syst. (**NeurIPS**), 2023 *(To Appear)*

a5 **L. Kong**, Y. Chen, M. Zhang, *"Geodesic Graph Neural Network for Efficient Graph Representation Learning."* Proc. Adv. Neural Inf. Process. Syst. (**NeurIPS**), 2022

a6 J. Wu, A Estornell, **L. Kong**, Y. Vorobeychik, *"Manipulating Elections by Changing Voter Perceptions."* International Joint Conference on Artificial Intelligence. (**IJCAI**), 2022

Preprint:

b2 J. Feng, H. Liu, **L. Kong**, Y. Chen, M. Zhang, *"TAGLAS: An atlas of text-attributed graph datasets in the era of large graph and language models."* [arXiv: 2406.14683]

b3 **L. Kong**, C. King, B. Fritz, Y. Chen, *"A Multi-View Joint Learning Framework for Embedding Clinical Codes and Text Using Graph Neural Networks."* [arXiv: 2301.11608]

b4 H. Liu, M. Zhang, Z. Dong, **L. Kong**, Y. Chen, B. Fritz, C. King, *"Time Associated Meta Learning for Clinical Prediction."* [arXiv: 2303.02570]

AWARDS AND HONORS

NeurIPS travel award, 2022/2023
Undergraduate Dean's List, Washington University in St. Louis, all semesters

TEACHING SERVICES

Washington University in St. Louis
CSE 543 Non-linear Optimization. **Lecturer/Grader**
CSE 231 Parallel Computing. **Teaching Assistant/Grader**

PROFESSIONAL SERVICES

Conference Reviewer: The Conference and Workshop on Neural Information Processing Systems (**NeurIPS** 2023/2024), The Conference on Computer Vision and Pattern Recognition (**CVPR** 2023/2024), European Conference on Computer Vision (**ECCV** 2024), International Conference on Learning Representations (**ICLR** 2024/2025), ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD** 2024/2025), ACM Transactions on Computing for Healthcare