

Keyu Duan

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RESEARCH INTERESTS

My research interests lies in the general area of machine learning, particularly on large-scale and efficient machine learning for practice.

EDUCATION

National University of Singapore (NUS)

Ph.D. of Computer Science

Singapore, Singapore

Aug. 2022 – May. 2026 (Expected)

Beihang University

B.E. of Software Engineering

Beijing, CHINA

Sept.2016 – Jun.2020

PUBLICATIONS AND PREPRINTS

Keyu Duan, Qian Liu, Tat-Seng Chua, Shuicheng Yan, Wei Tsang Ooi, Qizhe Xie, and Junxian He. “SimTeG: A frustratingly simple approach improves textual graph learning” *arXiv preprint arXiv:2308.02565 (2023)*.

Junnan Dong, Qinggang Zhang, Xiao Huang, **Keyu Duan**, Qiaoyu Tan, and Zhimeng Jiang. “Hierarchy-aware multi-hop question answering over knowledge graphs” *Proceedings of the ACM Web Conference 2023*, pp. 2519-2527. 2023.

Keyu Duan, Zirui Liu, Peihao Wang, Wenqing Zheng, Kaixiong Zhou, Tianlong Chen, Xia Hu, and Zhangyang Wang. “A comprehensive study on large-scale graph training: Benchmarking and rethinking” *Advances in Neural Information Processing Systems (NeurIPS) Track on Datasets and Benchmarks 35 (2022): 5376-5389*.

Tianlong Chen, Kaixiong Zhou, **Keyu Duan**, Wenqing Zheng, Peihao Wang, Xia Hu, and Zhangyang Wang. “Bag of tricks for training deeper graph neural networks: A comprehensive benchmark study” *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) 45, no. 3 (2022): 2769-2781*.

Qinggang Zhang, Junnan Dong, **Keyu Duan**, Xiao Huang, Yezi Liu, and Linchuan Xu. “Contrastive knowledge graph error detection” *Proceedings of the 31st ACM International Conference on Information and Knowledge Management (CIKM)*, pp. 2590-2599. 2022.

Fuzhen Zhuang, Zhiyuan Qi, **Keyu Duan**, Dongbo Xi, Yongchun Zhu, Hengshu Zhu, Hui Xiong, and Qing He. “A comprehensive survey on transfer learning” *Proceedings of the IEEE 109, no. 1 (2020): 43-76*.

RESEARCH EXPERIENCE

SoC at National University of Singapore

Ph.D. student co-supervised by Prof. Qizhe Xie and Prof. Wei Tsang Ooi

Singapore, Singapore

Aug. 2022 – Now

- * Work on large language models and its applications.
- * *SimTeG (Preprint)*: We propose a frustratingly simple but effective framework for textual graph representation learning. An ensembled version of our framework achieved new SOTA performance on **OGBN-Arxiv**, one of the most prestigious graph benchmark. We empirically find that better text embeddings could bridge the gap among GNN models.

DATA Lab at Rice University

Ph.D. student supervised by Prof. Xia (Ben) Hu

remote

Sept. 2020 – May. 2022

- * Work on Network Analytics and Graph Neural Networks (GNNs), particularly focusing on seeking practical algorithms to build deep or scalable GNNs. Note: admitted as Ph.D. student but ceased due to VISA issue.
- * *Bag of Tricks for Deep GNNs (TPAMI)*: we present the first fair and reproducible benchmark dedicated to assessing the “tricks” of training deep GNNs. We demonstrate that an organic combo of initial connection, identity mapping, group and batch normalization attains the new state-of-the-art results for deep GNNs on large datasets.
- * *Scalable GNN benchmarking and Rethinking (NeurIPS dataset and benchmark track)*: we present an extensive benchmark study on large scale graph training with systematic taxonomy and hyperparameter unification. We investigate several aspects of scalable GNNs regarding effectiveness and efficiency. Besides, we propose an additional method that mitigates the large CPU consumption issue in precomputing-based GNNs.

DEEP Lab at Hong Kong Polytechnic University

Research Assistant supervised by Prof. Xiao Huang

Hong Kong SAR, CHINA

Mar. 2021 – Mar. 2022

- * Work on knowledge graph reasoning and Completion.
- * *Hierarchy-aware multi-hop question answering (WWW)*: We propose a tree-like question answering framework utilizing knowledge graphs.
- * *Contrastive knowledge graph error detection (CIKM)*: We propose a error detection framework on knowledge graphs via contrastive learning.
- * *IRENE: Infomax Relation Networks for Inductive Knowledge Graph Completion*: Arguing the limitations of embedding-based paradigm for knowledge graph completion, we propose a new modeling for KGC and a corresponding GNN framework to address inductive KGC.

Key Laboratory of Intelligent Information Processing, CAS

Undergraduate Research Assistant supervised by Prof. Fuzhen Zhuang

Beijing, CHINA

May. 2019 – May. 2020

- * *A comprehensive survey on transfer learning (IEEE Proceedings)*: We provide a comprehensive survey on transfer learning, including an exhaustive taxonomy, benchmarks and its applications. Besides, I built a transfer learning toolkit for primers that is easy-to-use for quick experiments.

ENGINEERING EXPERIENCE

Matrix and Its Application Laboratory at Beihang University

Undergraduate Internship supervised by Prof. Hongyi Li

Beijing, CHINA

Sept. 2018 – Sept. 2019

- * *Automated Process of Satellite Reliability Assessment*: I participated in building an automated software platform to assess the reliability of satellite system components parallelly.