

Shenghao Qiu

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✉ <https://eps.leeds.ac.uk/computing/pgr/8738/shenghao-qiu>

Summary

My research lies at the intersection of high-performance deep learning systems and trustworthy artificial intelligence. It spans two complementary directions:

- Acceleration of Deep Learning Workloads. I focus on optimizing distributed communication and computation kernels to improve the scalability and efficiency of large-scale deep learning training. My work explores techniques in machine learning compilers, Graph Neural Networks (GNNs), and sparse tensor computation, with an emphasis on optimizing sparse matrix multiplications - one of the dominant computational bottlenecks in state-of-the-art models such as GNNs and Transformers.
- Explainable AI for Model Testing. I investigate the use of explainable AI (XAI) methods to enhance the trustworthiness and robustness of deep learning models. Specifically, I employ white-box testing approaches based on attribution techniques to systematically analyze internal neuron behavior, identify model weaknesses, and improve interpretability in complex neural architectures.

Experience

Alibaba (Beijing) Software Service Co. LTD	August 2021 - October 2021	Nubificus LTD	July 2022 - Present
		China	Software Engineer (Intern)
Software Engineer (Intern)			✉ https://nubificus.co.uk/

Education

Foshan University China GPA: 3.4/4	September 2015 - June 2019 Bachelor of Engineering	University of Leeds United Kingdom Distinction	September 2019 - November 2020 Master of Science
Thesis: "Research on Gait Recognition Based on Human Key Points and Long Short-Term Memory"			Thesis: "Deep learning classification of ECG signals to diagnose heart disease"
University of Leeds United Kingdom	October 2020 - March 2025	University of York PhD	July 2024 - Present Research Fellow

Projects

SOPRANO (Horizon Europe project) on Socially-Acceptable and Trustworthy Human-Robot Teaming for Agile Industries	Socially-Acceptable and Trustworthy Human-Robot Teaming for Agile Industries	July 2024 - Present
	✉ https://cordis.europa.eu/project/id/101120990	
AI4Work (Horizon Europe project) on Human-centric Digital Twin Approaches to Trustworthy AI and Robotics for Improved Working Conditions	Human-centric Digital Twin Approaches to Trustworthy AI and Robotics for Improved Working Conditions	July 2024 - Present
	✉ https://cordis.europa.eu/project/id/101135990	

Teaching Experience

School of Computing, University of Leeds

2021 - 2023

Teaching Assistant

- Module COMP3611 Machine Learning Teaching (Master and Undergraduate Level) Assistant. Supported both the lab session and tutorial. (September 2020 - December 2021, 2 semester)
- Module COMP1211 Computer Architecture Teaching Assistant (Undergraduate Level). Supported both the lab session and tutorial. (September 2022 - December 2023, 2 semester)

Awards

Industry PhD studentship

2020

Publications

Design of Mobile Environment Monitoring and Analysis System Based on GPRS

2018

IOP Conference Series. Materials Science and Engineering

Shenghao Qiu, Yangqing Zhu and Dingyao Liang

Optimizing Sparse Matrix Multiplications for Graph Neural Networks

2020

The 34th International Workshop on Languages and Compilers for Parallel Computing

Shenghao Qiu, Liang You, Zheng Wang

AIACC-Training: Optimizing Distributed Deep Learning Training through Multi-streamed and Concurrent Gradient Communications 2022

42nd IEEE International Conference on Distributed Computing Systems (ICDCS)

Lixiang Lin, Shenghao Qiu, Ziqi Yu, Liang You, Long Xin, Xiaoyang Sun, Jie Xu, Zheng Wang

STRONGHOLD: Fast and Affordable Billion-scale Deep Learning Model Training

2022

The International Conference for High Performance Computing, Networking, Storage, and Analysis (Super Computing 2022)

Xiaoyang Sun, Wei Wang, Shenghao Qiu, Renyu Yang, Songfang Huang, Jie Xu, Zheng Wang

Unleashing the Potential of Acquisition Functions in High-Dimensional Bayesian Optimization

2024

Transactions on Machine Learning Research

Jiayu Zhao, Renyu Yang, Shenghao Qiu, Zheng Wang

GraphCube: Interconnection Hierarchy-aware Graph Processing

2024

Principles and Practice of Parallel Programming (PPoPP 2024)

Xinbiao Gan, Guang Wu, Shenghao Qiu, Feng Xiong, Jiaqi Si, Jianbin Fang, Dezun Dong, Chunye Gong, Tiejun Li, Zheng Wang

Accelerating Tensor-train Decomposition on Graph Neural Networks

2025

Proceedings of 39th IEEE International Parallel & Distributed Processing Symposium

Shenghao Qiu, Chunwei Xia, Zheng Wang

Skills

Python



C/C++



LLVM/MLIR



ML/DL Framework

PyTorch/TensorFlow/PyG/DGL/MXNet/TVM



CUDA



LaTeX

