

XUANLEI ZHAO

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EDUCATION

National University of Singapore Ph.D. in Computer Science Supervisor: Yang You	01.2024 - Present
National University of Singapore M.S. in Computer Science	08.2022 - 12.2023
Huazhong University of Science and Technology B.Eng. in Computer Science & Electronic Information	09.2018 - 06.2022

RESEARCH INTEREST

- **Machine Learning System:** Parallelism, Scheduling, Offloading, Compiler.
- **Efficient Video Generation:** Efficient Training and Inference, Algorithm-System Co-Design.

RESEARCH HIGHLIGHT

PAB: The **First Real-Time** and **Most Cited** cache-based video generation acceleration method.

- Real-Time Video Generation with Pyramid Attention Broadcast
- *Xuanlei Zhao**, *Xiaolong Jin**, *Kai Wang*[†]*, *Yang You[†]*

VideoSys: The **First** and **Most Starred** open-source project for system speedup of video training and inference.

- VideoSys: An Easy and Efficient System for Video Generation
- Project lead.

DCP: The **First Practical** parallel method for efficient variable sequences training (*e.g.*, videos)

- Training Variable Sequences with Data-Centric Parallel
- *Geng Zhang**, *Xuanlei Zhao**, *Kai Wang[†]*, *Yang You[†]*

DSP: The **Most Efficient** sequence parallel for multi-dim transformers (*e.g.*, spatial-temporal video models).

- DSP: Dynamic Sequence Parallelism for Multi-Dimensional Transformers
- *Xuanlei Zhao*, *Shenggan Cheng*, *Chang Chen*, *Zangwei Zheng*, *Ziming Liu*, *Zheming Yang*, *Yang You*

HeteGen: Accelerate LLM offloading inference by heterogeneous computing between CPU and GPU.

- [MLSys 2024] HeteGen: Heterogeneous Parallel Inference for Large Language Models on Resource-Constrained Devices
- *Xuanlei Zhao**, *Bin Jia**, *Haotian Zhou**, *Ziming Liu*, *Shenggan Cheng*, *Yang You*

AutoChunk: A compiler to reduce activation memory by over 80% for long sequences (*e.g.*, videos).

- [ICLR 2024] AutoChunk: Automated Activation Chunk for Memory-Efficient Long Sequence Inference
- *Xuanlei Zhao*, *Shenggan Cheng*, *Guangyang Lu*, *Jiarui Fang*, *Haotian Zhou*, *Bin Jia*, *Ziming Liu*, *Yang You*

FastFold: The **First** and **Most Cited** system optimization method for AlphaFold by parallel and computing.

- [PPoPP 2024] FastFold: Optimizing AlphaFold Training and Inference on GPU Clusters
- *Shenggan Cheng*, *Xuanlei Zhao*, *Guangyang Lu*, *Jiarui Fang*, *Tian Zheng*, *Ruidong Wu*, *Xiwen Zhang*, *Jian Peng*, *Yang You*

INDUSTRY EXPERIENCE

Pika, Inc.

05.2024 - 08.2024

Research Intern | Supervised by Chenlin Meng

Palo Alto, CA

- Optimize distributed system on thousands of GPUs for efficient large-scale training of video models.
- Improve training performance with hybrid parallel, I/O optimization, and dynamic activation checkpointing.
- Improve generation efficiency with sequence parallel, adaptive computing, efficient kernel and distillation.

HPC-AI TECH, Inc. (Colossal-AI)

05.2022 - 12.2023

Research Intern | Supervised by Jiarui Fang

Singapore

- Contribute 48k lines of code as a core contributor (**rank 5th by 2023**) and help it gain 35k stars on Github.
- Propose AutoChunk, a compiler to reduce the activation memory by 80% for long sequences inference.
- Participate in the development of various parallelism strategies including sequence parallel, tensor parallel, ZeRO, offloading, auto parallelism and efficient kernels.