Peiran Xu

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Education

University of California, Los Angeles — Los Angeles, CA, USA
Ph.D., multimodal models, agentic reinforcement learning, computer vision, AI for science — Sep 2023 - present

Shanghai Jiao Tong University — Shanghai, China
Bachelor of Engineering — Sep 2019 - June 2023

Selected Publications

- ***Peiran Xu****, *Zhuohao Li**, *Xiaoying Xing*, *Guannan Zhang*, *Debiao Li*, *Kunyu Shi*: Hybrid Reward Normalization for Process-supervised Non-verifiable Agentic Tasks. (submit to ICLR'26) [arXiv]
- ***Peiran Xu****, *Zeyu Wang**, *Jieru Mei*, *Alan Yuille*, *Liangqiong Qu*, *Cihang Xie*, *Yuyin Zhou*: FedConv: Enhancing Convolutional Neural Networks for Handling Data Heterogeneity in Federated Learning. **(TMLR'24)** [arXiv]
- *Jianshu She**, *Zhuohao Li**, *Zhemin Huang*, *Qi Li*, ***Peiran Xu***, *Haonan Li*, *Qirong Ho*: Hawkeye: Efficient Reasoning with Model Collaboration. **(COLM'25)** [arXiv]
- ***Peiran Xu***, *Shihan Qiu*, *Hsu-Lei Lee*, *Sreekanth Madhusoodhanan*, *Pascal Sati*, *Yibin Xie*, *Debiao Li*: Weakly-Supervised Learning for Retrospective T1 and T2 Mapping from Conventional Weighted Brain MRI. **(ISMRM'25)**

Research Experience

Alibaba Group — Sunnyvale, CA, USA
Research Intern, advisor: Kunyu Shi — June 2025 - present

- Developed a principle-based Process Reward Model (PRM) that evaluates intermediate reasoning steps against general principles and sample-specific rubrics, enabling interpretable and principle-aligned supervision.
- Designed and implemented ReNorm, a unified reward normalization framework that integrates and balances process and outcome rewards in RL training, effectively stabilizing training and preventing collapse in long-trajectory optimization.

Cedars Sinai — Los Angeles, CA, USA
Research Assistant — Jul 2024 - present

- Developed weakly supervised method to generate T1/T2 mappings, leveraging MR physics equations for self-supervised pretraining and fine-tuning with minimal data. Achieved trustful image generation and reducing mapping time from twenty minutes to seconds. Paper submitted.
- Integrated medical metadata into multi-modal models to mitigate scanner variability, enhancing image reproducibility and model robustness.

Department of Computer Science, John Hopkins University — Baltimore, MD, USA
Research Intern, advisor: Prof. Alan Yuille, Prof. Cihang Xie and Prof. Yuyin Zhou — Jun 2022 - Sep 2022

- Research in Designing Robust Convolution Neural Networks for Federated Learning (FL)
- Conducted comprehensive investigation of Vision Transformer components and successfully integrated key elements into CNNs, significantly enhancing model performance in tackling heterogeneous data for FL in vision tasks
- Proposed a robust CNN architecture that achieved state-of-art results across various FL benchmarks, advancing the understanding of deep learning network architecture and setting a stronger baseline for future FL research.

Shanghai Jiao Tong University — Shanghai, China
Research Intern — Oct 2021 - May 2023

- **Efficient Endoscopic Video Super-Resolution:** Overcame limited computing resources on edge devices by optimizing lightweight network, and using ONNX and TensorRT for deployment to enable real-time inference
- **Automatic Detection of Cardiac Cycle:** Developed optical-flow-based video understanding neural network to distinguish cardiac phases in coronary angiography. Selected as national student project for excellence

Selected Awards

- Samueli School of Engineering Fellowship, UCLA — 2024
- Dean's List, SJTU — 2021-2023

Services & Interets & Skills

Reviewers & External Reviewers: TMLR'25, TPAMI, AIM
Research Interests: Reinforcement Learning (RL) for LLM agents; Foundation model of quantitative medical images
Framework & Skills: verl, slime, Multimodal (VLMs, MLLMs), Python, C/C++, PyTorch