JIAXIN YUE

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RESEARCH EXPERIENCE

Fine-Tuning LLMs for MRI-Based Alzheimer's Classification
March 2025-present

- Fine-tuned a vision-language LLM (**BLIP-2 + LLaMA**) using **LoRA-based supervised fine-tuning (SFT)** on 10,000 labeled MRI scans (CN vs AD).
- Implemented **PPO-based reinforcement learning (RLHF)** with clinician feedback to improve model consistency and interpretability.
- Achieved **92% test accuracy** and **0.91 F1-score**, with explainable Grad-CAM visualizations.

Topographical representations for longitudinal tau PET
Dec 2024 – Present

- Developed a **graph-based** topographical representation for longitudinal tau PET.
- Designed **spatiotemporal methods** for analyzing large-scale longitudinal imaging datasets, enabling the discovery of individual progression trajectory.
- Developed an **unsupervised subtyping and staging algorithm** (**clustering + probabilistic modeling**) to predict individual disease stages from populations.

Surface Tau PET Harmonization via Diffusion Model
Aug 2023 – Present

- Applied **deconvolution and artifact-removal pipelines** to restore signals from noisy tau PET data with off-target binding artifacts.
- Developed a multi-site imaging data **harmonization** framework based on **diffusion models (PyTorch)**, reducing inter-site variance by **15%**.
- Combined **contrastive learning** and **latent space encoders** for domain adaptation.

Uncovering Heterogeneity of Tau Pathology
Aug 2020 – Nov 2024

- Built a topographic representation of tau pathology via **Reeb graph analysis (MATLAB & C++)** on cortical surface data.
- Designed a **directed graphical model** to encode spatiotemporal disease progression patterns and population-level distributions in Alzheimer's cohorts.
- Applied **unsupervised clustering** to discover three clinically meaningful subtypes with distinct tau spreading trajectories.
- Validated model robustness on **out-of-distribution cohorts and preclinical datasets**, achieving superior generalization vs. the state-of-the-art **data-driven** method.

PUBLICATIONS

Yue, Jiaxin, Jianwei Zhang, Xinkai Wang, Yonggang Shi. "Robust Topographical Representation for Longitudinal Propagation of Tau Pathology." International Conference on Medical Image Computing and Computer-Assisted Intervention. Cham: Springer Nature Switzerland, 2025.

Yue, Jiaxin, Jianwei Zhang, Lujia Zhong, and Yonggang Shi. "Tau PET Harmonization via Surface-based Diffusion Model." 2025 IEEE International Symposium on Biomedical Imaging (ISBI). IEEE, 2025.

Yue, Jiaxin, and Yonggang Shi. "Uncovering Heterogeneity in Alzheimer's Disease from Graphical Modeling of the Tau Spatiotemporal Topography." International Conference on Medical Image Computing and Computer-Assisted Intervention. Cham: Springer Nature Switzerland, 2023.

Zhang, Hongbo, Xinyu Nie, **Jiaxin Yue**, Yuan Li, John Ringman, Yonggang Shi. "GPU Accelerated Modeling of Cortical Radial and Tangential Connectivity Changes in Neurodegeneration." International Conference on Medical Image Computing and Computer-Assisted Intervention. Cham: Springer Nature Switzerland, 2025.

Zhong, Lujia, Shuo Huang, **Jiaxin Yue**, Jianwei Zhang, Zhiwei Deng, Wenhao Chi, and Yonggang Shi. "TauAD: MRI-free Tau Anomaly Detection in PET Imaging via Conditioned Diffusion Models." *arXiv preprint arXiv:2405.13199* (2024).

Yue, Jiaxin, Xinkai Wang, John Ringman, and Yonggang Shi. "Graphical Modeling of Cortical Tau Pathology Topography for its Subtyping in Alzheimer's Disease." Imaging Neuroscience (under review)

RESEARCH INTERESTS

Machine learning, deep learning, generative model, vision-language model (VLM), large language model (LLM), computer vision, AI4science, medical image analysis

TECHNICAL SKILLS

Languages:	Python, Java, C/C++, JavaScript, MATLAB, Shell Scripting, HTML, CSS, SQL, Scala, LaTeX
Tools:	PyTorch, Keras, Sk-learn, TensorFlow, Git, OpenMP, OpenCL, Maven, WebGL, Perforce
ML/DL:	Linux, Docker, AWS, Azure
Web	Angular, Express, Node.js, Flask, Apache Tomcat
Big Data:	MapReduce, MongoDB, Hadoop, HBase, Hive

EDUCATION

University of Southern California
Aug 2020 – May 2026

- *Ph.D. in Electrical and Computer Engineering*
- *Advisor: Prof. Yonggang Shi*

University of Southern California
Aug 2018 – May 2020

- *M.S. in Electrical and Computer Engineering*
- *USC EE Master Student Honors Program*
- Relevant Courses:
  Analysis of Algorithms, Machine Learning, Deep Learning, Mathematical Pattern Recognition, Speech Recognition and Processing for Multimedia

Northwestern Polytechnical University
Sep 2014 - June 2018

- *B.S. in Automation*
- National Scholarship of China (Top 5%)
- Relevant Courses:
  C++ Programming, Artificial Intelligence, Computational Method, Information Networks and Applications, Digital Signal Processing

REFERENCE

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USC's Mark and Mary Stevens Neuroimaging and Informatics Institute