# Yuan Gao

Tel: +86 18695290558 | Email: yoggy23@sjtu.edu.cn
Address: No. 800, Dongchuan Road, Minhang District, Shanghai

## RESEARCH INTERESTS

- Multimodal Large Models
- Out-of-Distribution detection
- AI Agent

## EDUCATION

**Shanghai Jiao Tong University** **Shanghai**

- **Major:** Artificial Intelligence, **GPA:** 85.8 /100 September 2022 - June 2026
- **Core Courses:** Programming(Hornor) (89/100); Data Structure(Hornor) (90/100); Algorithm Design and Analysis (91/100); Linear Optimization and Convex Optimization (92/100); Intelligent Voice Technology (94/100); Machine Learning (89/100); Deep Learning (89/100); Computer Architecture (91/100); Stochastic Process (89/100); Natural Language Processing (98/100); Mathematical Logic (94/100); Computer Vision; Discrete Mathematics (Honor); Mathematical analysis (Hornor)
- **Honors:** Zhiyuan College Honors Scholarship (CN ¥5000, Top5%) 2022

## RESEARCH EXPERIENCE

**Nanyang Ye's Lab | Research Assistant** December 2023-October 2024

- Attend the research of OoD detection, design and conduct parameter ablation experiments in Python, help make scientific figures and charts, help analyze and polish the derivation of theory.
- Attend the research of Image Generation, provide an idea in order to improve the effects of generated images, conduct experiments in order to reveal the possibility of the idea but unfortunately failed.
- Our work "InfoBound: A Provable Information-Bounds Inspired Framework for Both OoD Generalization and OoD Detection" was accepted by TPAMI.

**Chen Zhao's Lab | Research Assistant** June 2025 – present

- Propose and co-lead an ongoing work on building dataset of intensive-reasoning retrieval task for multimodal large language model.

## SELECTED PROJECT EXPERIENCE

**Machine Learning | Individual** June 2024

- Systematically Read and learn the papers about support vector machine (SVM), explore and derive of the mechanism of SVM by myself.
- Implement the SVM algorithm individually in Python, upgrade the formal version with the addition of non-linear kernels, multiple kernels. Introduce sequential minimal optimization (SMO) to SVM, accelerating the computing process of SVM.
- Implement support vector classifier with 2 different ways – OvO and OvR, and conduct parameter ablation experiments and experiments on convergence, precision, efficiency of improved SVM.

**Natural Language Processing | Team Member** October 2024

- Conduct Supervised Fine-Tuning on Qwen-2.5-0.5B using instruction dataset Alpaca-cleaned.
- Process data for fine-tuning, create 2 different prompt formats for different instruction data form.
- Introduce Retrieval Augmented Generation into the fine-tuned model, conduct evaluation experiments on MMLU, ARC, BoolQ, HellaSwag.

**Brain-Inspired Intelligence | Team Member** November 2024

- Improve an advanced work SpikeYOLO by supplanting the convolution method used in SpikeYolo with Depth-wise Convolution.
- Introduce SpikeC2PSA into SpikeYOLO, integrate attention mechanism into C2PSA, which adds Residual shortcut, and convolution layer into the C2PSA.
- Quickly learned concepts of Spiking Neural Networks, systematically read and learn about the recent works in the SNN field, utilize the knowledge to support the works above.

**Computer Vision | Team Member** December 2024

- Conduct a survey on medical images segmentation, collect different datasets and adjust the model for accepting different input forms.
- Adjust the basic model SAM for medical uses using the low-rank adaptation (LoRA) and Adapter methods, which significantly reduces the computational overhead while retaining the generalization ability of SAM.
- Introduce the RAG framework to enhance the model's few-shot learning ability by using contextual information in the external memory bank. Image embedding is generated through DINOv2, and features of similar cases are retrieved and combined with the current task to improve the segmentation accuracy of complex anatomical

structures (such as the pancreas), especially in data-scarce scenarios.

## PUBLICATIONS

- InfoBound: A Provable Information-Bounds Inspired Framework for Both OoD Generalization and OoD Detection, TPAMI-2024, Lin Zhu, Yifeng Yang, Zichao Nie, **Yuan Gao**, Jiarui Li, Qinying Gu, Xinbing Wang, Chenghu Zhou, Nanyang Ye
- MRMR: A Realistic and Expert-Level Multidisciplinary Benchmark for Reasoning-Intensive Multimodal Retrieval, ICLR 2026, In Submission, Siyue Zhang*, **Yuan Gao***, Xiao Zhou*, Yilun Zhao, Chen Zhao

## SKILLS

- **Technology**: C, C++, Python, MATLAB, MS Office