

# Yanzhao Chen

📍 Guangdong Guangzhou    ✉ 20224001093@m.scnu.edu.cn    🌐 <https://www.scholix.com/yanzhao>  
 🏠 YanzhaoDrew    FancyAI-SCNU Member

## Education and Qualifications

**South China Normal University**  
*BS in Artificial Intelligence*

*Sept 2022 – May 2026*

- GPA: 3.8/5.0 (Ranking 5/101)
- **Coursework:** Linear algebra and Its Applications, Applied Probability and Statistic (**98**), Discrete Mathematics, Data Structure, Machine Learning (**92**), Computational Intelligence(**96**), Neural Networks and Deep Learning (**Theory 93/Exp 95**), Natural Language Processing, Computer Vision and Pattern Recognition

## About me

I am a self-motivated and disciplined researcher with strong problem-solving skills, specializing in Federated Learning (FL) and Mixture-of-Experts (MoE) architectures. And I have a strong focus on Video-LLM (VLLM) innovation and Video Diffusion methodologies, passionate about advancing Multi-Agent Systems (MAS) for scalable codebase maintenance, including issue resolution and long-term optimization. Actively contribute to the academic community as a Reviewer for AAAI-2024 and CVPR-2025.

## Academic Articles

**Heterogeneous Federated Learning with Scalable Server Mixture-of-Experts**[2]    Dec 2023 - May 2025  
*Co-first Authors*    Jingang Jiang\*, **Yanzhao Chen\***, Xiangyang Liu, Haiqi Jiang and Chenyou Fan<sup>†</sup>.  
 Accepted by **IJCAI-2025**

- **My Contribution:**
  - Collaborated on the design and implementation of the server-side MoE architecture, including the main expert and routed experts.
  - Conducted extensive experiments on vision (FEMNIST, CIFAR-10) and language (SENT-140, Yelp) tasks, demonstrating significant improvements over baseline methods.
  - Contributed to the optimization of the Non-IID data handling by introducing a Gating Entropy loss to diversify expert functions.
- **Research Focus:** Proposed a novel Federated Mixture-of-Experts (Fed-MoE) framework to address the challenges of deploying large models in power-constrained environments. Designed an asymmetric FL mechanism where compact client models are aggregated into a large server-side MoE model, enabling efficient learning from heterogeneous data.
- **Key Outcome:** Achieved state-of-the-art performance on both language task and vision tasks and outperforming existing FL and MoE baselines. The framework also showed robustness in large-scale federated learning scenarios with up to 100 clients.
- **Recommendation:** During the experiment, I found that MoE is usually difficult to converge in Non-iid scenarios. It is necessary to find a particularly appropriate balance between gating entropy and load balance weight, then could achieving convergence of MoE server and high performance. Therefore, I think we can find new strategies to strike a balance between specificity and versatility beyond information entropy weight in the future.

*Third Author*

Resubmitted to ICONIP-2025

- **My Contribution:**
  - Designed and collected the Robo dataset, simulating dynamic interactions among three robots (two walking collaboratively, one adjusting paths to avoid collisions).
  - Utilized a ROS-based 2D simulation environment with an  $11 \times 11$  grid map, implementing a 3-agent system to capture complex multi-agent behaviors.
  - Developed a fitness function inspired by Particle Swarm Optimization (PSO) for Agent-3 to navigate toward its target while avoiding dynamic obstacles, ensuring realistic collision-avoidance dynamics.
  - Structured episodes with 8-frame histories (4 seconds) and 12-frame futures (6 seconds), enabling robust testing of trajectory prediction models.
- **Research Focus:** Proposed a novel framework integrating Reinforcement Learning from Human Feedback (RLHF) and Rejection Sampling to enhance human trajectory prediction. Developed a diffusion-based scoring metric to quantify human preferences, enabling model fine-tuning for improved alignment with real-world decisions. Achieved 15% reduction in positional deviation and 20% increase in human preference alignment across benchmark datasets.
- **Key Outcome:** RLHF-ReS achieved state-of-the-art performance on Robo dataset (0.21m/0.29m ADE/FDE), outperforming existing methods by 9.7% in human preference alignment. Demonstrated the practicality of the diffusion score for real-time decision-making, with 67.4% Top-5 recall rate in retrieving optimal trajectories.


## Research Experience

---

NLP-CV Lab Participant | FancyAI Group, South China Normal University

Guangdong, Guangzhou  
May 2023 – Now

Adviser: Prof. Chenyou Fan

- **Lead Architect. Hierarchical-Multi-Scale-LLaVA** Inspired by SlowFast-LLaVA<sup>[4]</sup>, we research on Hierarchical-Multi-Scale-LLaVA. Address limitations of existing video-language models (e.g., SlowFast-LLaVA, PLLaVA) in long-video understanding and zero-shot generalization by designing a hierarchical multi-scale feature extraction framework. Achieving relatively higher performance in Video-QA multi-choice dataset (LongVideoBench, EgoSchema, TGIF-QA...).
- **Technical Presenter. About Diffusion Principle and Diffusion Models for Video Generation.** Delivered a technical deep-dive on diffusion processes (score matching, denoising steps) and showcased diffusion-video frameworks<sup>[3]</sup>, as depicted in [presentation files](#) .
- **Core Contributor. About Argoverse and VectorNet Mapping Research.** I firstly constructed a 2D LiDAR point-cloud map of campus infrastructure using robotic vehicle-based scanning, Then implementing DBSCAN clustering to classify objects by geometric features (width/length), enabling preliminary HD-map annotation for traffic sign/vehicle detection.

National Training Program of Innovation and Entrepreneurship for Undergraduates: *Rational decision System Based on Multi-agent cooperation*

Guangdong, Guangzhou  
June 2024 – Apr 2025

Advisor: Prof. Chenyou Fan

- Inspired by our patent<sup>[5]</sup>, an intelligent decision system combining multi-agent cooperative perception and large language model (LLM) is developed to realize efficient path planning and interactive navigation of robots in unknown environments.
- Established real2sim mapping framework using LiDAR-based environmental scanning and inter-robot data fusion, converting spatial information into semantic text representations through rasterization algorithms, effectively overcoming occlusion challenges in single-agent perception.
- Designed multi-agent debate and reflection mechanism guided by prompt engineering, achieving dynamic path planning through iterative argumentation processes. Ultimately, Sim2Real framework was used to

verify the feasibility of the system in real scenarios.

### ***Institutional Research on Large-Scale Models for Academic Services***

*Guangdong, Guangzhou*

*Leader. Advisor: Prof. Chenyou Fan*

*June 2025 – May 2025*

- **Web RAG-Enhanced Academic Service Intelligence Platform (Web RAG-ASIP):** Developed an AI-powered administrative support system featuring containerized deployment of the DeepSeek-R1 model via Ollama, integrating a college-specific vector retrieval database with text embedding techniques to index institutional policy documents. By leveraging Retrieval-Augmented Generation (RAG) architecture, the system achieved real-time Q&A functionality through dual interfaces (web GUI and API endpoints). This implementation demonstrated measurable efficiency improvements in administrative workflows while maintaining 89% accuracy in student service interactions, significantly optimizing institutional management through intelligent information retrieval and natural language processing capabilities.
- **Student Academic Warning Model:** Led the development of a domain-specific LLM-based academic risk identification system by constructing a comprehensive dataset of students' historical performance and behavioral data (e.g., attendance, assignment submissions, exam trends). Improved the LLM architecture into MoE through targeted fine-tuning with curriculum learning strategies and domain-adapted prompt engineering, enabling accurate prediction of academic risks for upcoming semesters.

## **Patent**

### ***A Large Language Model-Based Robot Path Planning and Perception Method and System[5]***

*Guangdong, Guangzhou*

*Apr 2023 – Oct 2024*

*Adviser: Prof. Chenyou Fan*

- Developed a novel framework integrating Large Language Models (LLMs) with robotic navigation, enabling dynamic path planning and real-time perception in complex environments. Achieved 15% reduction in positional deviation and 20% improvement in alignment with human preferences through quantified feedback mechanisms.
- Enabled 67.4% Top-5 recall rate in retrieving optimal paths without ground-truth data, validated on ETH, UCY, and custom Robo datasets.
- Reduced Final Displacement Error (FDE) by 17.1% in collision-prone scenarios through rejection sampling and RLHF fine-tuning.

## **Awards and Honors**

<b>1<sup>st</sup> Prize Scholarship, South China Normal University (3%)</b>	<i>2023</i>
<b>2<sup>st</sup> Prize Scholarship, South China Normal University (8%)</b>	<i>2024</i>
<b>The 3rd provincial-level Prize of national mathematic contest in Guangdong for undergraduate students</b>	<i>2023</i>
<b>The 3rd provincial-level Prize of national mathematic contest in Guangdong for undergraduate students</b>	<i>2024</i>
<b>The Honorable Mention of Mathematical Contest In Modeling</b>	<i>2024</i>

## **Technologies**

**Languages:** C++, python, matlab

**Framework:** Deepspeed, Pytorch, Accelerate, FastAPI, Gradio, Huggingface

## **Under Professional Service**

Reviewer for CVPR-2025.

## **Skills**

**Language:** Chinese Mandarin (native), Cantonese (basic), English (IELTS Candidate, CET6: 559)

**Interest:** Basketball, Travel

## References

---

- [1] Anonymous. Boosting human trajectory prediction with reinforcement learning from quantified human preferences, 2025.
- [2] Jingang Jiang, Yanzhao Chen, Xiangyang Liu, Haiqi Jiang, and Chenyou Fan. Heterogeneous federated learning with scalable server mixture-of-experts. In *Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI)*, 2025. Co-first authors: Jingang Jiang and Yanzhao Chen.
- [3] Lilian Weng. Diffusion models video generation. *lilianweng.github.io*, Apr 2024.
- [4] Mingze Xu, Mingfei Gao, Zhe Gan, Hong-You Chen, Zhengfeng Lai, Haiming Gang, Kai Kang, and Afshin Dehghan. Slowfast-llava: A strong training-free baseline for video large language models, 2024.
- [5] Chenyou Fan; Man Wang; Shaobin Ling; Jiakai Huang; YanzhaoChen; Chujia Chen; Kangqi Zhang. A large language model-based robot path planning and perception method and system, Patent CN 119414833 A.