# XIAOYAN GUO (FLORA)

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## EDUCATION

**University of Science and Technology of China(USTC),Hefei,China** *Sep 2022-Jun 2026*
**School of the Gifted Young**
Major in Computer Science and Technology
Overall GPA: 3.79/4.3 (88.14%)
**Core Courses**
Data Structure(95) , Graph Theory(90), Analog and Digital Circuits(92) , Introduction to Computing Systems(92) , Computer Systems in Detail(A) , Object Oriented Design and Programming(90)

## RESEARCH INTERESTS

**AI-assisted Software engineering development, LLM, Software testing**

## PUBLICATION & WORKING PAPERS

1. Jinghan Li, Junfeng Fang, Jinda Lu, Yuan Wang, **Xiaoyan Guo**, Tianyu Zhang, Tao Liang, Xiang Wang, Xiangnan He. *Enhancing Multi-Modal LLMs Reasoning via Difficulty-Aware Group Normalization.* Accepted by ICML 2026. PDF.

2. Jingyi Chen, **Xiaoyan Guo**, Songqiang Chen, Shing-Chi Cheung, Jiasi Shen. *Multi-Agent Systems for Dataset Adaptation in Software Engineering: Capabilities, Limitations, and Future Directions.* arXiv.

## EXPERIENCE

**AI-Driven Multi-Agent Frameworks for Adaptive Code Completion** *Aug 2025 – Present*
*Research Assistant* *Assistant Professor Jiasi Shen, Department of Computer Science and Engineering, HKUST*

· **Objective:** Develop and evaluate multi-agent systems that adapt code completion methods to new datasets, thereby advancing AI-assisted software development.

· **Responsibilities:**

- Co-designed and conducted experiments to evaluate multi-agent systems' capability of adapting established code completion technologies to unseen project datasets, thereby analyzing robustness and generalization in cross-project adaptation scenarios.
- Investigated the effectiveness and structural design of fixing prompts through automated prompt engineering, employing sequential fixing strategies to reduce specific error types in code generation.
- Identified substantial behavioral differences between GPT and Claude; captured Copilot's internal prompts using mitmdump and container-based packet interception when direct certificate installation was restricted.
- Developed a VSCode extension (GitHub) to enable Python-based interaction with GitHub Copilot and partially automate evaluation workflows.

· **Progress and Next Steps:**

- Completed initial experiments on adaptation and correction, with an associated arXiv preprint.
- Contributed to the development of a unified multi-agent framework integrating adaptation and error-correction strategies, aiming for more reliable AI-assisted code generation.

**Enhancing MLLMs Reasoning via Difficulty-Aware Group Normalization** *Jul. 2025 - Sep.2025*
*Research Assistant* *Prof. Xiangnan He, School of Data Science, USTC*

- **Objective:** To address limitations in the RL algorithm Group Relative Policy Optimization (GRPO)[1], applied within the framework of Reinforcement Learning with Verifiable Rewards (RLVR) for multimodal reasoning, specifically its instability on multimodal inputs caused by uniform group-wide rewards.
- **Responsibilities:**
  - Analyzed item correctness frequencies and performed difficulty-aware re-grouping, using data-centric (image entropy) and model-centric (response confidence) indicators as the primary criteria for determining sample difficulty.
  - Evaluated the proposed method across multiple multimodal(text-image) reasoning benchmarks.
  - Drafted major sections of the paper, including Preliminaries, Related Work, Experiments, and Appendix, and contributed to overall academic writing and analysis.
- **Achievements:**
  - Developed an effective algorithmic enhancement that preserves intra-group distinctions, avoids data loss, and mitigates the influence of extreme reward distributions, achieving consistent improvements across five multimodal reasoning benchmarks on Qwen2.5-VL-7B-Instruct (up to **+8.8** on MathVista and **+1.2–2.0** average gains over GRPO/DAPO baselines).
  - Preprint under review at ICLR 2026 (an available version from google drive).

**Knowledge-Enhanced Agents Based on RAG[2] and Web Search in LLM** *Apr 2024 - May 2025*
*Team Member, Presenter* *Dr. Feng Zhao, School of Information Science and Technology, USTC*

- **Objective:** Improve a large-language-model agent framework lagent by (i) enhancing domain-specific expertise in responses, (ii) reducing hallucinations, and (iii) achieving both through real-time grounding with web retrieval and RAG modules.
- **Responsibilities:**
  - Led the design and implementation of the WebSearch subsystem, integrating real-time web evidence into LLMs via a dual-agent architecture.
  - Co-designed and developed key components of the WebSearchAgent, including plugins for Google Search, Google Scholar, and arXiv via the Serper API.
  - Refined the logic of the WebPlannerAgent, using stream-based planning strategies to coordinate retrieval and generation actions
  - Contributed to the RAG subsystem by implementing diverse document parsers and enhancing the multi-layer knowledge graph pipeline to support retrieval and context enrichment.
- **Achievements:**
  - Successfully deployed a real-time, plugin-enhanced LLM system supporting complex information retrieval and open-domain question answering.

## SCHOLARSHIPS AND AWARDS

[1]GRPO (Group Relative Policy Optimization) is a variant of policy-optimization in RL that samples multiple responses per prompt and uses reward normalization across the group rather than a value network.

[2]RAG (Retrieval-Augmented Generation): a paradigm that enhances language models by retrieving relevant external knowledge to ground generation.

**SCHOLARSHIPS**

Standardization Examination Scholarship *Nov 2023*
Excellent undergraduate scholarship (bronze medal) *Sep 2023, Sep 2024*
Qiangwei Scholarship *Sep 2023*
Outstanding Freshman Scholarship (Third Prize) *Sep 2022*

**AWARDS**

The 15th National College Student Mathematics Competition (Second Prize) *Dec 2023*
Member of Talented Youth Initiative, School of Psychological and Cognitive Sciences,PKU *Aug 2022*

## SKILL SETS

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|---|---|
| **Computer Languages** | C, C++, Python, JAVA, Rust |
| **Language** | TOEFL(111), CET-4(623), GRE(324+3.5) |