Hao Yan

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Research Interests

- LLM for Code
- Generative AI
- LLM Security
- Conversational AI
- Persona Simulation
- Semantic Parsing
- Question Answering
- Prompt Engineering

Education

George Mason University   **Aug. 2021 – Current**
*PhD in Computer Science advised by **Prof. Ziyu Yao**; GPA: 3.84*   *Fairfax, VA*

George Mason University   **Aug. 2018 – Dec. 2020**
Masters in Computer Science   *Fairfax, VA*

Fujian Normal University   **Aug. 2013 – Jun. 2017**
Bachelors in Electronic and Information Engineering   *China*

Publications

LLM Security   **Advisors: Prof. Ziyu Yao and Xiaokuan Zhang**

Guiding AI to Fix Its Own Flaws: An Empirical Study on LLM-Driven Secure Code Generation   (under review by ICSE 2026)

- Conducted a systematic evaluation of both proprietary and open-weight large language models (LLMs) to assess their tendency to generate insecure code.
- Developed and tested self-generated vulnerability hints to proactively detect and prevent security issues in LLM outputs, and proposed practical guidelines for creating effective hints.
- Analyzed LLMs' ability to repair vulnerable code under varying levels of feedback, offering insights into their adaptability and real-world applicability in software development.

Persona Simulation   **Advisor: Prof. Ziyu Yao**

Can LLMs Simulate Personas with Reversed Performance? A Benchmark for Counterfactual Instruction Following
(under review by COLM 2025)

- Proposed a new benchmark for evaluating whether LLMs can follow counterfactual instructions to simulate persons with reversed math performance levels.
- Introduced Degree of Contrast (DoC), a metric that compares reasoning behaviors between high- and low-performing personas to measure instruction adherence beyond task accuracy.
- Conducted a systematic evaluation of 7 leading LLMs (e.g., GPT-4o, o1, etc) and identified key limitations in their ability to simulate counterfactual personas.

Conversational AI & Prompt Engineering   **Advisor: Prof. Ziyu Yao**

IntelliExplain: Enhancing Conversational Code Generation for Non-Professional Programmers   (arXiv preprint 2024, [link])

- Analyzed user behaviors in code generation with Chat-based LLMs, identifying limitations such as complex explanations and unstructured interactions that hinder non-professional programmers from generating code efficiently and accurately.
- Developed IntelliExplain, a novel paradigm with enhanced explanations and a structured interaction to improve code comprehension and efficient feedback loop.
- Demonstrated IntelliExplain's effectiveness in assisting non-professional programmers write and debug code through comprehensive user studies.

Semantic Parsing   **Advisor: Prof. Ziyu Yao**

Learning to Simulate Natural Language Feedback for Interactive Semantic Parsing   (ACL 2023, [link])

- We proposed a new task of simulating NL feedback for interactive semantic parsing to abate the need of human-annotated feedback data to train the interactive semantic parser.
- On a text-to-SQL dataset, we show that our feedback simulator can generate high-quality NL feedback to boost the error correction ability of a specific parser.
- In low-data settings, our feedback simulator can help achieve comparable error correction performance as trained using the costly, full set of human annotations

Professional Experience

George Mason University　　　　　　　　　　　　　　　　　　　　**Aug. 2022 – Now**
Graduate Research Assistant　　　　　　　　　　　　　　　　　　　　　　　*Fairfax, VA*
- Conducting research under Prof. Ziyu Yao on NLP with a focus on LLM-based Code Generation and Interaction, Persona Simulation.

George Mason University　　　　　　　　**Jan. 2020 – Dec. 2020, Aug. 2021 – Now**
Graduate Teaching Assistant　　　　　　　　　　　　　　　　　　　　　　*Fairfax, VA*
- Conducted weekly lab sessions for undergraduate courses and fostered an engaging learning environment for diverse student populations.
- Collaborated with faculty to design and refine lecture slides, lab exercises, and instructional resources.
- Offered individualized support during office hours, addressing questions and guiding students through challenging concepts.

Bright Sky Tech Inc.　　　　　　　　　　　　　　　　　　　**Jan. 2021 – Aug. 2021**
Front-end Developer　　　　　　　　　　　　　　　　　　　　　　　*Annandale, VA*
- Participated in the implementation and maintenance of a web-based online grocery platform.
- Contributed to the development and maintenance of the application using modern web technologies, including Angular, Firebase, TypeScript, and Ionic.

Honors and Awards

- **CAHMP 2024 Summer GRA Award**, George Mason University, (May 2024)
- **Graduate Student Travel Fund (GSTF)**, George Mason University, (July 2023)
- **Distinguished GTA Award**, George Mason University, (May 2022)
- **Graduate Students Poster Award (Honorable Mention)**, George Mason University, (May. 2022)
- **Outstanding GTA Award**, George Mason University, (May 2020, May 2021)

Professional Activities/Services

Reviewer

- IJCAI 2025: The 34th International Joint Conference on Artificial Intelligence
- ICLR 2025: The Thirteenth International Conference on Learning Representations
- IEEE CI-NLPSoMe 2025: IEEE Symposium on Computational Intelligence in Natural Language Processing and Social Media
- WLLFM 2024: IEEE BigData 2024 From Theory to Practice: Workshop on Large Language and Foundation Models
- NeurIPS 2023 (Secondary): Conference on Neural Information Processing Systems

Volunteer

- Student Volunteer @ The 61st Annual Meeting of the Association for Computational Linguistics (ACL), 2023

Invited Talk

- LLM agent: build your own personal assistant @ The EPIC SPICE Intern Program, George Mason University, 2024

Technical Skills

Languages: Python, Java, C, HTML/CSS, JavaScript, TypeScript, SQL
Developer Tools: VS Code, Eclipse, AWS Platform
Technologies/Frameworks: Pytorch, TensorFlow, Keras, Linux, GitHub, Angular