Zheyuan Zhang

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Education

Ph.D. Student. School of Computer Science, Carnegie Mellon University. **2025.8 - now**
Language Technology Institute. WInE Group. Advised by Prof. Sherry Tongshuang Wu. *4.00/4 GPA*

- **Relevant Coursework:** Advanced NLP (A+), Inference Algorithms for Language Modeling (A+)

Master Student. Computer Science and Technology. Tsinghua University **2022.9 - 2025.6**
Knowledge Engineering Group. Advised by Prof. Juanzi Li. *3.95/4 GPA (Top 10%)*

Bachelor Student. Xinya College. Tsinghua University **2018.9 - 2022.6**
Bachelor of Law. Major in Philosophy, Politics, and Economy (PPE). Minor in Psychology. *3.76/4 GPA (Top 10%)*

Research

My current research focus: Deep Research, Collaborative Literature Exploration, and Sensemaking.
I believe agents should be fundamentally user-centric—assisting users to make sense of information and inspiring new ideas. I study how users make decisions (data) and how to sensemake collaboratively (model).
Generally, I work on **Human-Centric AI** in two main directions:

Understanding and Improving Language Models from Human Perspective

Employing empirical methods and cognitive psychology approaches, I aim to: (1) Understand the capabilities and mechanisms of language models; (2) Examine the alignment of language models with human cognitive structures; (3) Investigate the potential applications of language models in mimicking human cognitive processes; and (4) Explore the effects of language models on human cognition and social behavior.

1. **Zhang, Z.***, Yu, J.*, Li, J., Hou, L. (2023). Exploring the Cognitive Knowledge Structure of Large Language Models: An Educational Diagnostic Assessment Approach. Findings of EMNLP 2023.
2. **Zhang, Z.**, Li, R., Kabir, T., Boyd-Graber J. (2024). NAVIG: Natural Language-guided Analysis with Vision Language Models for Image Geo-localization. In submission to ACL 2025.
3. Sabour, S., Liu, S., **Zhang, Z.**, Liu, J. M., Zhou, J., Sunaryo, A. S., ... Huang, M. (2024). EmoBench: Evaluating the Emotional Intelligence of Large Language Models. ACL 2024.
4. Zhang-Li, D., Lin, N., Yu, J., **Zhang, Z.**, Yao, Z., Zhang, X., ... Li, J. (2024). Reverse That Number! Decoding Order Matters in Arithmetic Learning. arXiv preprint arXiv:2403.05845.

Human-Agent Interaction

Leveraging state-of-the-art AI technologies, I design innovative applications and interaction paradigms for human benefit. For example, I work on challenges posed by AI in the educational domain, build AI systems to enhance learning experiences, and explore how the technologies affect learning behaviors and cognitive processes.

1. **Zhang, Z.***, Zhang-Li, D.*, Yu, J., Gong, L., Zhou, J., Liu, Z., Hou, L., Li, J. (2024). Simulating Classroom Education with LLM-Empowered Agents. NAACL 2025.
2. Tu, S.*, **Zhang, Z**.*, Yu, J., Li, C., ... Li, J. (2023). LittleMu: Deploying an Online Virtual Teaching Assistant via Heterogeneous Sources Integration and Chain of Teach Prompts. CIKM 2023.
3. Zhang-Li, D.*, **Zhang, Z.***, Yu, J., Yin, J. L. J., Tu, S., ... Li, J. (2024). Awaking the Slides: A Tuning-free and Knowledge-regulated AI Tutoring System via Language Model Coordination. KDD 2025.
4. Yu, J., **Zhang, Z.**, Zhang-Li, D., Tu, S., Hao, Z., Li, R. M., ... Sun, M. (2024). From MOOC to MAIC: Reshaping Online Teaching and Learning through LLM-driven Agents. arXiv preprint arXiv:2409.03512.
5. Zhong, Q., Yu, J., **Zhang, Z.**, Mao, Y., Wang, Y., Lin, Y., ... Tang, J. (2022). Towards a General Pre-training Framework for Adaptive Learning in MOOCs. arXiv preprint arXiv:2208.04708.

* indicates equal contribution. Only the papers with which I'm deeply engaged are listed here. For a full list, please check my Google Scholar.

Professional Services:

Conference Reviewer: CIKM 2024, ARR 2024/2025, AAAI 2025, KDD 2025/2026, WWW 2026

Journal Reviewer: npj Science of Learning.

Projects

LittleMu: a Virtual Teaching Assistant on Chinese MOOC platform.

- LittleMu is a Virtual Teaching Assistant that instantly helps students with their learning and provides emotional support. LittleMu is deployed on xuetangx.com, **one of the largest MOOC platform** in China. By 2023, LittleMu has served **more than 80,000 users** with over 300,000 queries from over 500 courses.
- We trained a classifier to enable LittleMu to return the most appropriate responses with RAG. For instance, for knowledge-based questions, we utilize knowledge graphs to find the corresponding knowledge; for chit-chat, we leverage the capabilities of LLMs. We also made preliminary attempts to enhance the reasoning abilities of LLMs.
- We conduct experiments with LittleMu and this work was published in **CIKM 2023** (co-first author).

MAIC: Massive AI-powered Courses platform in Tsinghua University.

- We built a AI-powered Course platform called MAIC, where we simulate classrooms for student learners: the teachers and classmates are all LLM agents, and **the lessons are automatically conducted** where students can interrupt anytime.
- MAIC now has over **90,000 student users** across universities and high schools. Experimental results show that the classmate agents in the system can help enhance students' sense of **social and cognitive presence**. Students interact more with the system have better learning outcomes.
- Relevant works are accepted by **NAACL 2025** (first author) and **KDD 2025** (co-first author).

Honors and Awards

Outstanding Master's Thesis **2025**
Title: Intelligent Classrooms based on Large Language Model Agents

Outstanding Master's Graduates **2025**
Outstanding Graduates of Beijing, Outstanding Graduates of DCST

Siebel Scholar **2024**
Siebel Scholar Class 2025, Top 5 in Tsinghua University for outstanding academic performance and leadership

Huiyan Talent Comprehensive Scholarship **2024**
Comprehensive Scholarship for Graduate Students

Outstanding Graduates **2022**
Outstanding Graduates of Tsinghua University, Outstanding Graduates of Beijing

Toyota Scholarship of Tsinghua University **2021**
Comprehensive Scholarship

Excellent Comprehensive Scholarship of Tsinghua University **2019, 2020, 2021**
Comprehensive Scholarship

Excellent Scholarship of Tsinghua University **2019, 2020, 2021**
Academic (2019, 2020, 2021); Social Work (2020); Sports (2019, 2020, 2021)

Experiences

WInE Lab, Carnegie Mellon University **2025.7 - Now**
Ph.D. Student. Advised by Prof. Sherry Tongshuang Wu

CLIP Lab, University of Maryland **2024.6 - 2024.11**
Research Intern. Advised by Prof. Jordan Boyd-Graber

Foundation Model Research Center, Tsinghua University **2024.3 - 2025.6**
Research Intern. Advised by Prof. Zhiyuan Liu

THUNLP, Tsinghua University **2024.3 - 2025.6**
Research Intern. Advised by Prof. Zhiyuan Liu

THUKEG, Tsinghua University **2021.9 - 2022.6**
Research Intern. Advised by Prof. Juanzi Li