Xinming Hou

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Summary

Research Interests: I am deeply interested in the intersection of **NLP**, **social science**, and **neuroscience**. Recently, I have become particularly fascinated by the similarities and differences in the **working mechanisms and characteristics of human cognition and NLP models**. My focus is on combining insights from neuroscience with mechanisms discovered in NLP models to gain a deeper understanding of both fields.

Research Goal: My research goal is to **enhance the explainability of AI systems**. Specifically, I aim to investigate the intricate relationships among **"language"**, **"reasoning"**, and **"knowledge"** within NLP models. Ultimately, I hope to:

- Illuminate the **path toward AGI** in the NLP field, enabling more feasible implementation pathways as well as more precise control and alignment of NLP models.
- Explore technological pathways for efficiently integrating AI capabilities with the human brain and societal structures **at a deeper and more neuroscience-informed level**, fostering seamless human-AI collaboration.

Education

Gaoling School of Artificial Intelligence, Renmin University of China (RUC) *Beijing, China*

Bachelor's of Engineering (B.Eng.) in **Artificial Intelligence** with Honors *Sept. 2021-Jun. 2025(Expected)*

- overall GPA: 3.5/4, Major GPA: 3.68/4
- Relevant Courses: Machine Learning, Deep Learning, Natural language processing, Algorithm Design and Analysis, Data Structure and Algorithm, Python Programming, C & C++ Programming, Probability and Statistics, Advanced Algebra, Mathematical Analysis.

Publications

CoAct: A Global-Local Hierarchy for Autonomous Agent Collaboration

Xinming Hou, Mingming Yang, Wenxiang Jiao, Xing Wang, Zhaopeng Tu, Xin Zhao.

In submission to The 2024 Conference on Empirical Methods in Natural Language Processing, 2024 [Paper]

Research Experience

Renmin University of China *Beijing, China*

Research Assistant at RUC AI Box, advised by Prof. Wayne Xin Zhao *Jul. 2022 - Present*

- **Research Topics:** natural language processing, explainability
- Delved into topics related to knowledge discernment and memory management to enhance factuality control of language models.
- Builded a self-improvement framework in various complex cognitive and reasoning tasks, and explored the universal pipeline for building user-friendly prompts, incorporating various ICL methods.
- Exploring Transformer mechanisms at the neuronal level, inspired by the language networks' behaviors and characteristics in the human brain, aiming to investigate LLMs' multilingual capabilities and reasoning mechanisms.

Tencent AI Lab *Shenzhen, China*

Research Intern at NLP Reaserch Group , advised by Wenxiang Jiao and Xing Wang *Jul. 2023 - Jun. 2024*

- **Research Topics:** the self-organization and humanity of multi-agents system
- Explored the potential of transferring human societal work patterns to AI systems.
- Investigated efficient and flexible collaboration methods for LLM agents to enhance real-world complex task handling capabilities.

Project Portfolio (Selected)

Classical Chinese Poetry Creation Model *Beijing, China*

Founder & Developer, advised by Prof. Rui Yan and Prof. Danjun Cai / [Pre. Slides] *Feb. 2023 - Apr. 2024*

- Proposed a Chinese Tang Poetry creation pre-trained language model, which endows the model with vitality and a complete life cycle like Tang dynasty poets, and enables emotional interaction with users.
- Won the Best Creativity Award in The 14th Student Entrepreneurship Star Competition, JD Cup.

Survey of Large Language Models *Beijing, China*

PROOFREADER, ADVISED BY PROF. WAYNE XIN ZHAO / [PAPER] / [GITHUB] / [BOOK] *Mar. 2023 - May. 2023*

- Conducted overall and detailed review to translate the paper into a high-quality Chinese version.
- Corrected the inconsistencies and ambiguities in the text and provided feasible suggestions for improvement.

Implementation of a Basic Search Engine *Beijing, China*

FOUNDER & DEVELOPER, ADVISED BY PROF. JIAXIN MAO / [CODE] *Aug. 2022*

- Coursework for Artificial Intelligence Integrated Design, voted as the best system (1/14)
- Built A website that supports school community network search using HTML5, CSS, and JS languages.
- Applied the advanced methods of web crawler and classical algorithms of information retrieval (such as TF-IDF, PAGE-RANK, etc.)

Skills

Programming C/C++, Python, LaTeX , Linux, SQL, MATLAB, HTML5, CSS, JS, etc.

Frameworks PyTorch, Tensorflow, NumPy, DeepSpeed, Git, Anaconda, etc.

Honors and Awards (Selected)

2022 **National First Prize**, National College Student Mathematical Modeling Competition (top 0.60%)

2023 **Finalist**, Mathematical Contest in Modeling (top 2%)

2024 **First Prize**, Sa shixuan Elite Fund Scholarship

2023 **Best Creativity Award**, The 14th Student Entrepreneurship Star Competition, JD Cup(50,000 RMB prize)

2022 **Best System**, GSAI Artificial Intelligence Integrated Design

2022 **1st place**, RUC Group Competitive OJ Contest for Programming Course (Captain, 1/22)