

# 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)

- Average score: 87.2; 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, 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.
- Built 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

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**Programming** C/C++, Python,  $\text{\LaTeX}$ , Linux, SQL, MATLAB, HTML5, CSS, JS, etc.

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

## Honors and Awards (Selected)

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- 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)