Shaoyang Cui(Joey)

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GitHub Profile

Education

• **Bachelor of Engineering in Artificial Intelligence** *Sep 2021 - Jul 2025*

Yuanpei College, Peking University

Overall Grade: 86/100 | **GPA**: 3.52/4.0

*Note: Member of the **Tong Class**, an honorary pilot program specializing in AI at Peking University.*

Research Interests

My research focuses on understanding and explaining the essence of Intelligence, aspiring to create Artificial General Intelligence(AGI). Specifically, my areas of focus include:

- **Top-down:** Analyzing and interpreting intelligence from a macroscopic perspective, focusing on studies of intention, consciousness, and world models. My goal is to leverage existing AI technologies to explain and replicate intelligent phenomena.
- **Bottom-up:** Based on computational neuroscience, I want to mimic the computational logic of biological intelligence through detailed models. I got to know many fields including brain-like models, brain region analysis and simulation(even training) of detailed neuron model. I aim to explore new research directions in intelligence science and develop approaches better suited to AGI.

Publication

– **Task Ability Decomposition and Difficulty Quantification of Visual Tasks for AGI Evaluation** *Mar 2024 - Jul 2025*

Cui, S. Y., He, X. Y., Han, J. H., Zhang, Z. L., & Peng, Y. J.

∗ **Accepted (in press)** at **Science China Technological Sciences (JCR Q1)**. Full title available upon request.
∗ First to explore the structure of task–ability space and its link to task difficulty.
∗ Proposed TADDL-V: a framework for quantifying difficulty of visual tasks to support AGI evaluation.
∗ Released AGI-V70: a curated benchmark set for testing diverse visual abilities. See GitHub.

Projects & Experiences

∗ **FAB: Factory of Abstract-style Benchmark** *Nov 2024 – May 2025*

Independent Project

· Developed the first fully automated, low-cost benchmark generation framework for abstract-style evaluation across general-purpose domains.
· Enabled scalable testing of large language models using structured abstraction errors, covering semantic, structural, and factual variants.
· Free to use at GitHub: FAB Benchmark Repository.

∗ **Exploring the Computational Robustness of Tall Pyramidal Cells** *Sep 2022 - Jan 2023*

Supervised by Dr.Kai Du(kai.du@pku.edu.cn)

· Conducted independent exploration: Study on the robustness of the response of L5PC neuronal cells to noise of different distributions, to further explore the computational characteristics of detailed neuronal models. See Github repository for details.
· Proposed new perspectives on the differences between biological intelligence and mainstream artificial intelligence paradigms.

∗ **Possible Models of Self-Awareness in Conscious Turing Machines** *Sep 2022 - Dec 2022*

Course Project, supervised by Prof. Lenore Blum(CMU) and Prof.Manuel Blum(CMU)

· Invited to present at the **IJTCS2023** workshop.
· Based on the previous works of Conscious Turing machine(CTM), discussed the consciousness and self-consciousness of a CTM, gave a clear definition.
· Examined whether the CTM framework aligns with key definitions of human consciousness to evaluate its potential for generating awareness.
· Concerning some illusion and disorder phenomena, create a possible model and workflow(the 'MIT' model) to understand how those phenomena works in CTM, and thus grasp a glimpse of the generation of consciousness in CTM.

∗ **IJCAI2022-2023 Special Track: Application of Deep Residual Networks to Mahjong Tasks** *Jun 2022 - Jun 2023*

Course Project, supervised by Prof. Wenxin Li(lwx@pku.edu.cn), Professor at Peking University

- Used supervised learning algorithm based on CNNs(ResNet and Res2Net and DenseNet), performed feature extraction and strategy learning on a large amount of expert game-play data.
- Awarded **10th** place **IJCAI2022** Chinese Standard Mahjong AI Competition and **7th** place in 2023(See game page for details), invited to present at the **IJCAI2023** special track.

On-campus Extracurricular Activities

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Team Manager and Coach of Women's Football Team,Yuanpei College *Oct 2022 - Jun 2024*

- In charge of managing and organizing training sessions and game schedules, communicate with club management to ensure adequate support and resources.
- Design weekly training plans to enhance the players' overall abilities. Observed player performances and provide guidance and feedback.

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Member of the Tennis Team,Yuanpei College *Oct 2022 - Present*

- Enthusiastic about tennis! Follow the coach's instructions, actively took part in training sessions, and maintain team spirit with team members.

Personal Qualities

IELTS: 7.5

Technical Skills: Proficient in PyTorch, NEURON as well as development tools like Git and GitHub.