WEIHUA DU

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103B, Building 2, Zijing Apartment, Tsinghua University, 100084 Beijing, China

EDUCATION

Bachelors of Engineering in Computer Science (Yao Class)

Tsinghua University

Sep. 2020 – Present Beijing, China

- GPA 3.93 / 4.00;
- Gold medalist at the 2018 China National Olympiad in Informatics (NOI), leading to direct admission into Tsinghua University.

Visiting Student

Massachusetts Institute of Technology

Feb. 2023 – Aug. 2023 Boston, US

- Advised by Prof. Joshua B. Tenenbaum and Prof. Chuang Gan.
- Specialized in Large Language Models as Agents and Embodied AI.

RESEARCH INTERESTS

LLM-Based Agent
Embodied AI and Robotics
Reinforcement Learning
Cognitive Science

LANGUAGES

- Chinese: Native Speaker.
- English: TOEFL 103.

RESEARCH (*DENOTES EQUAL CONTRIBUTION)

Building Cooperative Embodied Agents Modularly with Large Language Models NeurIPS 2023 FMDM Workshop

Authors: Hongxin Zhang*, **Weihua Du***, Jiaming Shan, Qinhong Zhou, Yilun Du, Joshua B. Tenenbaum, Tianmin Shu, Chuang Gan.

- **ICLR 2024 average review score 6.5 (8, 6, 6, 6)**;
- We developed cooperative embodied agents by leveraging LLM, named *CoELA*, focusing on communicating and reasoning in multi-agent embodied environments. *CoELA* can cooperate effectively with both AI agents and humans.

Automatic Truss Design with Reinforcement Learning IJCAI 2023

Authors: **Weihua Du***, Jinglun Zhao*, Chao Yu, Xingcheng Yao, Zimeng Song, Siyang Wu, Ruifeng Luo, Zhiyuan Liu, Xianzhong Zhao, Yi Wu.

- We built *AutoTruss*, a two-stage framework addressing the complex combinatorial optimization challenge of truss layout design in the building industry, which outperforms the previous baselines on both 2D and 3D truss design tasks.

Iteratively Learn Diverse Strategies with State Distance Information NeurIPS 2023

Authors: Wei Fu, **Weihua Du**, Jingwei Li, Sunli Chen, Jingzhao Zhang, Yi Wu.

- We developed a diversity-driven RL algorithm, State-based Intrinsic-reward Policy Optimization (SIPO). SIPO consistently produces strategically diverse and human-interpretable policies that surpass existing baselines.

T-Eval: Evaluating the Tool Utilization Capability Step by Step Arxiv Preprint

Authors: Zehui Chen*, **Weihua Du***, Wenwei Zhang*, Kuikun Liu, Jiangning Liu, Miao Zheng, Jingming Zhuo, Songyang Zhang, Dahua Lin, Kai Chen, Feng Zhao

- We built a comprehensive Tool-calling Capacity Evaluation benchmark, pinpointing the main bottlenecks of current LLMs in tool learning, which provides a new perspective in LLM evaluation on tool utilization.

Constrained Human-AI: An Inclusive Embodied AI Assistance Challenge Submit to CVPR 2024

Authors: Andi Peng*, **Weihua Du***, Jiaming Shan*, Tianmin Shu, Chuang Gan.

- We created a new benchmark, *TDW-Constrained*, which encompasses a variety of household tasks that test the AI's ability to infer and execute based on the human partner's physical limitations.

HAZARD Challenge: Embodied Decision Making in Dynamically Changing Environments Submit to ICLR 2024

Authors: Qinhong Zhou*, Sunli Chen*, Yisong Wang, Haozhe Xu, **Weihua Du**, Hongxin Zhang, Yilun Du, Joshua B. Tenenbaum, Chuang Gan.

- **ICLR 2024 average review score 6.75 (8, 8, 6, 5);**
- We created *HAZARD*, a novel benchmark for evaluating the decision-making abilities of intelligent embodied agents within high-fidelity virtual environments that undergo dynamic changes, like fire, flood, and wind.

SELECTED PRIZES

Zheng Geru Scholarship | Comprehensive Excellent Award in Tsinghua University, top 20% — Oct. 2023

Mr. and Mrs. Qu Yuzhi Scholarship | Academic & Sport Award in Tsinghua University — Oct. 2022

Mr. and Mrs. Huang Yicong Scholarship | Comprehensive Excellent Award in Tsinghua University, top 20% — Oct. 2021

Andrew C. Yao Award (Recognition Prize) | Scholarship in Yao Class, top 20% — Sep. 2023

China Collegiate Programming Contest (CCPC), Weihai Site | Rank 5, **Gold Medal** — Nov. 2021

China National Olympiad in Informatics (NOI) 2018 | Rank 32, **Gold Medal** — Aug. 2018

EXPERIENCE

Research Intern

MIT-IBM Watson AI Lab, Massachusetts Institute of Technology

Feb. 2023 – Present | Boston, US / Remote

- Advised by Prof. Joshua B. Tenenbaum and Prof. Chuang Gan;
- Developed cooperative embodied agents by leveraging Large Language Models (LLMs), focusing on communication and reasoning in complex embodied multi-agent environments.

Research Intern

Shanghai Artificial Intelligence Laboratory

Aug. 2023 – Present | Shanghai, China

- Advised by Dr. Wenwei Zhang and Dr. Kai Chen;
- Involved in the iterating of InternLM, focusing on improving tool calling capabilities.

Research Intern

IIIS, Tsinghua University

Jun. 2022 – Jan. 2023 | Beijing / Shanghai, China

- Advised by Prof. Yi Wu;
- Developed *AutoTruss*, a two-stage framework addressing the complex combinatorial optimization challenge of truss layout design in the building industry;
- Another work aimed to optimize rewards and discover diverse strategies, developing a diversity-driven RL algorithm, State-based Intrinsic-reward Policy Optimization (SIPO).

OTHERS

- Member of Tsinghua University Volleyball Team.
- Volunteer at the Student Development Center of Tsinghua University.
- Accumulated 187.0 hours of officially documented volunteer work during my undergraduate studies.