

Run Peng

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EDUCATION

University of Michigan, Ann Arbor - MS in *Computer Science* (GPA: 3.96) Sep.2022 – Apr. 2024
University of Michigan, Ann Arbor - BSE in *Computer Science* Sep.2020 – Apr. 2022
Shanghai Jiao Tong University - BSE in *Electrical and Computer Engineering* Sep.2018 – Aug. 2022

PUBLICATIONS (Listed in order of personal interest)

Towards A Holistic Landscape of Situated Theory of Mind in Large Language Models

Ziqiao Ma, Jacob Sansom, **Run Peng**, Joyce Chai; *EMNLP 2023 Findings* Jun 2023 – Nov 2023

- Collaboratively designed and executed ten distinct tasks in a 2D grid-world environment, accommodating both single and multi-agent scenarios. Engaged in a comprehensive comparison study, assessing the performance of Large Language Models (LLMs) across seven facets of Theory of Mind.

Go Beyond Imagination: Maximizing Episodic Reachability with World Models

Yao Fu, **Run Peng**, Honglak Lee; *ICML 2023 Poster* Dec 2022 – Mar 2023

- Pioneered a unique method integrating long-term experience and episodic memory in exploration, designed intrinsic motivation for policy learning, which further enhanced computational modeling.
- Successfully implemented four benchmark baselines, ranging from procedurally generated sparse-reward 2D environments to continuous control domains, reinforcing its broad applicability and robustness.

Learning Exploration Policies with View-based Intrinsic Rewards

Yijie Guo*, Yao Fu*, **Run Peng**, Honglak Lee; *NeurIPS 2022 DeepRL Workshop* Apr 2022 – Aug 2022

- Performed hypothesis testing, and ablation studies of a novel intrinsic reward design for reinforcement learning; Succeeded in both 2D and 3D environments, and under both task-oriented and task-agnostic settings. Our model significantly outperforms the SOTA.

Think, Act, and Ask: Open-World Interactive Personalized Robot Navigation

Yinpei Dai, **Run Peng**, Sikai Li, Joyce Chai; *ICRA 2024* Aug 2023 – Present

- Implemented the whole pipeline for personalized object navigation with GPT as backbone, the sim-to-real conversion, prompt designing, backbone-system coding, experiments execution, and evaluation.

Exploring LLM in Intention Modeling for Human-Robot Collaboration

Sikai Li, **Run Peng**, Yinpei Dai, Jenny Lee, Joyce Chai; *IROS 2023 Late Breaking Result* Jul 2023 – Oct 2023

- Engineered an innovative robot-human collaboration framework, where a human and robot cooperatively negotiate and execute tasks. Successfully integrated LLM for real-time human intention modeling for better collaboration.

Smart Agent-Based Modeling: On the Use of Large Language Models in Computer Simulations

Zengqing Wu, **Run Peng**, Xu Han, Shuyuan Zheng, Yixin Zhang, Chuan Xiao; *preprint* Jul 2023 – Oct 2023

- Executed a comprehensive case study on emergency evacuation simulation with LLM agents; 100+ agents are simultaneously involved in a room, where they need to escape as soon as they can; Agents are controlled by GPT4, assigned with different personas, and can communicate with their surroundings.

RESEARCH & PROJECT EXPERIENCE (*)

CommonGrid: Building Common Ground through Belief Maintenance in Situated Communication

Advisor: Joyce Chai, University of Michigan, with her PhD student Ziqiao (Martin) Ma Oct 2022 – Present

- Developed a collaborative benchmark within a 2D grid-world environment, emphasizing the maintenance of first and second-order beliefs among multiple agents during collaborative tasks. Implemented an innovative online interactive platform for data collection.
- Applied Reinforcement learning for collaborative task completions and designed various forms of communications, including natural language dialogues and belief sharing, for better performance. This approach aimed to explore the impact of establishing and maintaining common ground through communication on the overall efficiency and effectiveness of collaborative efforts.

Robotics Object Tracking with Humans in the Loop

Advisor: Joyce Chai, University of Michigan, with her PhD student Ziqiao (Martin) Ma Jan 2023 – Present

- Conducted comprehensive research on the performance of traditional Computer Vision (CV) tasks within real-world robotics contexts, focusing particularly on the impact of human activities leading to alterations in object states.
- Collected and analyzed a multi-object tracking dataset, captured in a residential-like setting using a physical robot.

Unsupervised Task Clustering with Multi-routed Policy Network

Advisor: Honglak Lee, University of Michigan, with his PhD student Yijie Guo Oct 2021 – Mar 2022

- Implemented a multi-routed policy network and applied unsupervised clustering to enable automatic task assignment.
- Investigated AI's behaviors under different dynamics and reward functions; Figured out the generalization quality.

Lightweight of Low light Video Enhancement Algorithm

Advisor: Yinqiang Zheng, University of Tokyo May 2021 – Dec 2021

- Improved low-light video quality by designing a novel neural network that places attention on binary binning.

INTERNSHIP

LG AI Research

Ann Arbor, MI, US

ML Research Engineer

Sep 2023 – Dec 2023

- Implemented whole evaluation pipeline for modularized 3-step GPT-based dialog system (including NLG, DM, and NLU modules); Implemented GPT-based end-to-end baseline for comparison study.
- Implemented GPT-evaluator that is able to automatically generate human-like judgements on the overall performance of dialog systems; Enabled a low-cost, highly-reliable substitution of human evaluators.
- Designed GPT-as-agent module that simulates users to interact with dialog systems; By specifying user requirements and personas, various user behaviors and scenarios can be largely covered with relatively small amount of trials.

INTSIG (Key App products: CamScanner, CamCard)

Shanghai, China

Algorithm Engineer

Aug 2020 – Jan 2021

- Extended Kubernetes & K3S to Cloud deployment construction; Designed automatic, minimized installation method for small companies without scaled web clusters or related engineers.
- Constructed Lua SDK of mockserver for web testing to raise efficiency of coordination between front and back-end; Constructed Lua SDK of SQL (mysql, postgres) code format correction for preventing SQL injection.

PAPER REVIEW

EMNLP 2023, HRI 2024, CHI 2024, ARR NAACL 2024

TEACHING EXPERIENCE

EECS484 Database - Instructional Aide

May 2022 – Jun 2022

- Presented 1-hour in-person discussions twice a week for 80+ students; Opened 4-hour office hours per week on average.
- Designed 2 exam questions, mainly on topics related to Relational Algebra, Memory and Transaction.

VE281 Data Structures and Algorithms - Teaching Assistant

May 2021 – Aug 2021

- Responsible for designing assignments (alone), exams (co-work) and giving recitation classes every week.

AWARDS & HONORS

- Dean's List & University Honors, University of Michigan, Ann Arbor

Dec 2020 & Apr 2021

- Scholarship for Academic Excellence, UMJI-SJTU, Shanghai

Aug 2019

- Honorable Mention in Mathematical Contest in Modeling

May 2019

- First Prize of National Olympiad in Informatics in Provinces, Shanghai, China

Dec 2016

SKILLS

Computer: Pytorch, Tensorflow, python, C/C++, Lua, Matlab, Kubernetes, SQL

Fields: NLP, LLM, Reinforcement Learning, Deep Learning, Embodied AI, Computer Vision, Robotics, Networking

Languages: English (Fluent, TOEFL: 109, IELTS: 7.5), Japanese (Native, JLPT-N1)