

Hao Li

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🐙 Github

EDUCATION

National University of Singapore (NUS)

Visiting Student, computer science

Jul 2023 – Jul 2024 (Expected)

Supervised by Prof. Tat-Seng Chua, and mentored by Dr. An Zhang

University of Electronic Science and Technology of China (UESTC)

Master, computer science

Sep 2021 – Jul 2024 (Expected)

Co-advised by Prof. Jingkuan Song, Prof. Lianli Gao, and Prof. Heng Tao Shen

Northeast Forestry University (NEFU)

B.S., computer science

Sep 2017 – Jul 2021

RESEARCH INTERESTS

AI Agents, Multi-modality, Large Language Model, Trustworthy Learning.

PUBLICATIONS

- **Hao Li**, Jingkuan Song, Lianli Gao, Pengpeng Zeng, Haonan Zhang, Gongfu Li. "A Differentiable Semantic Metric Approximation in Probabilistic Embedding for Cross-Modal Retrieval". *NeurIPS 2022*. [pdf](#)
- **Hao Li**, Jingkuan Song, Lianli Gao, Xiaosu Zhu, Heng Tao Shen. "Prototype-based Aleatoric Uncertainty Quantification for Cross-modal Retrieval". *NeurIPS 2023*. [pdf](#)
- Xu Zhang*, **Hao Li*** (co-first author), Mang Ye. "Negative Pre-aware for Noisy Cross-modal Matching". *AAAI 2024*. [pdf](#)
- An Zhang*, Leheng Sheng*, Yuxin Chen*, **Hao Li**, Yang Deng, Xiang Wang, Tat-Seng Chua. "On Generative Agents in Recommendation". (under review) [pdf](#)

RESEARCH EXPERIENCE

Long-term Multi-session Personalized Dialogue Agent.

Nov 2023 – Present

Supervisor: Prof. Tat-Seng Chua, Mentor: Dr. An Zhang, National University of Singapore, NExT++ Lab

Ongoing

- Extract user traits in long-term dialogue and provide personalized response are urgently demanding.
- Introduce a LLM-empowered agent framework with designed memory module and personas extraction module.
- Provide a fine-tuning paradigm with ChatGLM to realize accurate personas extraction, memory search, and better response generation.
- Demonstrate the effectiveness of proposed framework on multi-session dialog benchmarks.

A Simple and Effective Denoising Method for Any Contrastive-based Tasks.

Nov 2023 – Present

Supervisor: Prof. Tat-Seng Chua, Mentor: Dr. An Zhang, National University of Singapore, NExT++ Lab

Ongoing

- Introduce a simple denoising approach that can be easily implemented.
- With only a little extra computational cost compared to previous denoising methods.
- Significant performance improvements observed on multiple tasks and benchmarks with various noise ratios.

Generative Agents for User Simulation in Recommendation. [pdf](#)

Jul 2023 – Oct 2023

Supervisor: Prof. Tat-Seng Chua, Mentor: Dr. An Zhang, National University of Singapore, NExT++ Lab

Under Review

- Pioneer exploration of the LLM-empowered agents for recommendation.
- Utilize LLM to initialize 1,000 agents as the users, and build a virtual recommendation simulation system.
- Demonstrate the reliability of simulation through extensive alignment experiments and provide insightful potential benefit for current recommendation systems, such as data augmentation through simulation.

Advanced Negative Perception for Robust Cross-modal Matching. [pdf](#)

May 2023 – Aug 2023

Collaborators: Xu Zhang, and Prof. Mange Ye

AAAI 2024

- Introduce a novel two-steps training paradigm, which can predict the negative impact of each training sample on model performance in advance, to achieve robust learning in cross-modal matching.
- Prove the significant superiority of the proposed paradigm compared to traditional noise-rectify paradigm, and outperform all previous state-of-the-arts with a considerable performance gap.

Prototype-based Aleatoric Uncertainty Quantification for Cross-modal retrieval. pdf

Dec 2022 – May 2023

Co-supervisors: Prof. Jingkuan Song, Prof. Lianli Gao, and Prof. Heng Tao Shen, UESTC, CFM Lab

NeurIPS 2023

- Pioneer in introducing aleatoric uncertainty into multi-modality, who provides a reasonable and clear aleatoric uncertainty definition for multi-modal data.
- Utilize *Dempster-Shafer Theory of Evidence* (DST) and *Subjective Logic* (SL) to build a theoretical aleatoric uncertainty quantification framework for cross-modal retrieval.
- Through quantify uncertainty of each sample, we can precisely select the high-quality data and make the pre-training process more efficient (achieving similar performance with a smaller amount of high-quality data).

Differentiable Semantic Metric Optimization for Cross-modal Diverse Retrieval. pdf

Nov 2021 – May 2021

Co-supervisors: Prof. Jingkuan Song, Prof. Lianli Gao, UESTC, CFM Lab

NeurIPS 2022

- Propose a semantic metric-based mining approach to find out enormous potential positive correspondences in the multi-modal datasets.
- Introduce a new metric that can estimate the diversity of retrieved gallery, and propose a metric directly optimization algorithm.
- Demonstrate the effectiveness and generalization under extensive settings, including probabilistic or non-probabilistic model, many-to-many or one-to-many benchmarks.

PROJECTS

Robot Vision in RoboMaster (more details)

Sep 2017 – Sep 2020

1. Visual aiming and shooting

- Our robots should attack other teams' robots by shooting. I designed an Automatic Aiming Shooting System to help our robots precisely shoot enemies. There are two main parts: 1) **Object Detection Module**, 2) **Host Communication Module**.

2. Energy mechanism shooting in 2018

- Robots should recognize 5 digits in Nixie tubes, then shoot the digits of 9 LEDs below in order. After successfully hitting one digit each time, the order of the 9 digits in the LED will be randomly reset. Besides, if a certain digit is shot incorrectly or if the interval between two shots exceeds 1.5 seconds, it needs to be reactivated.

3. Energy mechanism shooting in 2019

- Robots need to recognize the rotating windmill from 8 meters away and shoot the glowing blades in order. Additionally, if the wrong blade is shot or if the interval between two shots exceeds 2 seconds, it needs to be reactivated.

HONORS AND AWARDS

Academic Honors and Awards:

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| • Hand in Hand Special Scholarship, NEFU (Top 1%) | Nov 2018 |
| • Outstanding Student Scholarship, NEFU (Top 3%) | Nov 2020 |
| • Youth Academic Award, UESTC (Top 3%) | Apr 2023 |
| • Enterprise Special Scholarship, UESTC (Top 3%) | Nov 2023 |

Competition Achievements:

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| • RoboMaster University Championship 2018 (Regional Champion) | Aug 2018 |
| • RoboMaster University Technical Challenge 2018 (Global Third Place) | Aug 2018 |
| • RoboMaster University Technical Challenge 2019 (Global Second Prize) | Aug 2019 |
| • China Undergraduate Mathematical Contest in Modeling (National Second Prize) | Nov 2020 |
| • National Artificial Intelligence Innovation & Application Competition (National First Prize) | Mar 2023 |

SERVICE

The reviewer of TMM 2023, WWW 2024, CVPR 2024, ICML 2024, ECCV 2024.