Hao Li

Personal Homepage | 18th.leolee@gmail.com | Google Scholar | 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". ***SIGIR 2024***. 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 Contrastrive-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 — ***SIGIR 2024***

- 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 amout 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*:**
- 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*:**
- 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.