Ruiyang Zhang

☎ (+853) 63680758 | ✉ yc47931@um.edu.mo | 🌐 ruiyang-061x.github.io
🐙 Ruiyang-061X | 🎓 Ruiyang Zhang

Introduction

Ruiyang Zhang is a Ph.D. candidate at the University of Macau. He receives his B.S. in Computer Science and Technology from Fudan University.

His research focuses on enhancing the **reasoning** and **tool use capabilities** of **multimodal agents** through reinforcement learning. He previously worked on exploring the uncertainty of large multimodal models and on 3D object detection in unsupervised settings.

Education

University of Macau   *Aug. 2024 -*
Ph.D. in Faculty of Science and Technology   Macau SAR
Advisor: **Prof. Zhedong Zheng**

Fudan University   *Sept. 2017 - Jun. 2021*
B.S. in Computer Science and Technology   Shanghai, China

Research Experience

Research Intern @ IDEA idea   *Octo. 2025 -*
Mentor: Dr. Yiyan Qi   Shenzhen, China

- Topics: Developing long-horizon multimodal search agent via reinforcement learning (RL)
- Responsibilities: (1) Build the RL infrastructure required to develop multi-turn tool-using multimodal search agent, including tool implementation, caching mechanism, and RL framework adaptation. (2) Build long-horizon, multi-turn multimodal search agent in real-world web environment via reinforcement learning. Propose a systematic post-training framework for multimodal search agents, including Iterative Injection-based Data Synthesis, Rejection Sampling Fine-tuning, and RL.

Research Intern @ Shanghai AI Lab   *May 2025 - Sept. 2025*
Mentor: Dr. Dongzhan Zhou   Shanghai, China

- Topics: Leveraging RL to incentivize sketch-style reasoning in large multimodal models
- Project: SketchThinker-R1
- Responsibilities: (i) Devise Sketch-Mode Cold Start to instill initial sketch-style reasoning into base multimodal model; train SketchJudge reward model to pose supervision on thinking style during the RL stage; conduct Sketch-Thinking Reinforcement Learning to further generalize sketch-style reasoning. (ii) Evaluation on benchmarks across various domains, showing that SketchThinker-R1 achieves over 64% reduction in thinking cost without compromising answer accuracy.

Selected Award

- Second Prize, China Undergraduate Mathematical Contest in Modeling (CUMCM)   2019
- Third Class Scholarship for Outstanding Students, Fudan University   2018 & 2019
- First Prize, Chinese Mathematical Olympiad in Jiangsu Province (CMO)   2016
- First Prize, National Olympiad in Informatics in Jiangsu Province (NOIP)   2014 & 2015

Publication

1. **[ICLR 2026] SketchThinker-R1: Towards Efficient Sketch-Style Reasoning in Large Multimodal Models**
Ruiyang Zhang*, Dongzhan Zhou*, Zhedong Zheng
[Paper] | [Code]
- Incentivize sketch-style reasoning in large multimodal models to improve reasoning efficiency.

2. **[ICCV 2025] Harnessing Uncertainty-aware Bounding Boxes for Unsupervised 3D Object Detection**
Ruiyang Zhang, Hu Zhang, Hang Yu, Zhedong Zheng
[Paper] | [Code]
- Aim to mitigate the negative impact of noisy pseudo boxes.

3. **[ECCV 2024] Approaching Outside: Scaling Unsupervised 3D Object Detection from 2D Scene [40+ Github Stars]**
Ruiyang Zhang, Hu Zhang, Hang Yu, Zhedong Zheng
[Paper] | [Code]
- Enhance detection of far and small objects via LiDAR and 2D data fusion.

Preprint

1. **[Preprint] Uncertainty-o: One Model-agnostic Framework for Unveiling Epistemic Uncertainty in Large Multimodal Models**
Ruiyang Zhang, Hu Zhang, Hao Fei, Zhedong Zheng
[Paper] | [Code] | [Website]
- Applicable to both large comprehension model and large generation model.

2. **[Preprint] VL-Uncertainty: Detecting Hallucination in Large Vision-Language Model via Uncertainty Estimation [30+ Citations]**
Ruiyang Zhang, Hu Zhang, Zhedong Zheng
[Paper] | [Code] | [Website]
- Preliminary attempt for understanding uncertainty in LVLM.

Skill

Programming: Python (Pytorch), C/C++, Java, MATLAB
Language: English (IELTS 7.0/9.0), Chinese (Native)

Work Experience

Meituan *Jul. 2021 - Jun. 2023*
Backend Development Engineer Shanghai, China

Open Source

1. **[Awesome List] Awesome-MLLM-Uncertainty [50+ Github Stars]** [Code]
- Curated list of papers on the uncertainty in multi-modal large language model (MLLM).

2. **[Awesome List] Awesome-MLLM-Reasoning** [Code]
- Curated list about reasoning abilitiy of MLLM, including OpenAI o1, OpenAI o3-mini, and Slow-Thinking.