Chaoyang Wang

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EDUCATION

- **Central South University** Changsha, China
  Undergraduate student in Automation; GPA: 3.7/4.0 *Sep. 2022 – Present*

RESEARCH INTERESTS

Multimodal Learning, Large Language Model, Computer Vision

PUBLICATIONS

- **Token Merge for Composed Image Retrieval** Dec 2024 - Apr 2025
  ACMMM 2025, Under Review, First Author
  - Proposed the TMCIR framework, which solves the issues of feature fusion efficiency and intent explanation bias in Compositional Image Retrieval (CIR) with multi-modal queries through two innovations: intent-aware cross-modal alignment and adaptive Token fusion.
  - Experimental results indicate that TMCIR significantly improves the performance of CIR tasks and enhances the accurate capture of user search intent.

- **Enhancing Visual Reasoning in Multimodal Models** Mar 2025 - May 2025
  NeurIPS 2025, Under Review, First Author
  - Focused on improving the visual reasoning capabilities of Multimodal Large Language Models (MLLMs). Addressed the limitations of existing Reinforcement Learning (RL) methods, such as restricted exploration space and low training efficiency, by proposing a novel RL framework called Vision-EKIPL. This method introduces high-quality actions generated by an external auxiliary model during RL training to guide the optimization of the policy model.
  - Compared to traditional RL methods, Vision-EKIPL significantly expands the model's exploration space, enhances the upper bound of reasoning capabilities, and substantially accelerates training convergence speed and efficiency. Experimental results show that Vision-EKIPL achieves up to a 5% performance improvement over existing SOTA methods on the Reason-RFT-CoT benchmark.

- **MLLM-based Re-ranking for Image Retrieval** Dec 2024 - May 2025
  NeurIPS 2025, Under Review, First Author
  - Addressed the accuracy issue of Top-K similar image ranking in image retrieval systems by proposing a method that utilizes Multimodal Large Language Models (MLLMs) to simulate human perception for re-ranking. Existing methods primarily rely on image representations, which struggle to capture true user search intent. This project fine-tunes MLLMs using Direct Preference Optimization (DPO) to align initial Top-K candidate images with actual preference order. This approach leverages MLLMs' joint visual and textual understanding capabilities to enhance ranking performance.
  - Extensive experiments on Composite Image Retrieval (CIR) and Cross-View Geo-Localization (CVGL) tasks demonstrate that this method effectively improves ranking performance, with a maximum R@1 metric increase of 5.2%.

PROJECTS

- **Few-Shot Learning for Industrial Image Recognition** Developed a knowledge-guided few-shot learning method for industrial wheel hub image recognition, incorporating structured parameters and image info via cross-attention.
- **RLHF in Medical Q&A Models** Implemented Reinforcement Learning from Human Feedback (RLHF) for the medical question-answering model BianQue-2. This involved training a Reward Model using medical dialogue preference datasets and applying the PPO algorithm to enhance the model's usefulness and harmlessness.

AWARDS AND HONORS

- The First Prize Scholarship, CSU, 2023 (top 1.5%)
- National 2st Prize, Competition of Service Outsourcing and Entrepreneurship Innovation, 2023
- National 2st Prize, "Internet+" Innovation and Entrepreneurship Competition, 2024
- M Award, The International Mathematical Contest in Modeling (MCM), 2023

Skills

- **Programming**: Python, C++, Matlab

- **Languages**: Chinese(native), English