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Fangkai Jiao

Education

Aug 2022 – Dec 2026 **Ph.D. Candidate, Computer Science and Engineering**, *Nanyang Technological University*.
Advisor: *Prof. Shafiq Joty*, *Prof. Nancy. F. Chen*, and *Prof. Aixin Sun*.

Sep 2019 – Jun 2022 **M.Phil, Computer Science and Technology**, *Shandong University*.
Advisor: *Prof. Liqiang Nie* and *Prof. Xuemeng Song*.

Sep 2015 – Jun 2019 **B.Eng, Software Engineering**, *Shandong University*.
Undergraduate Thesis Advisor: *Prof. Minlie Huang* and *Prof. Liqiang Nie*.

Experience

Mar 2025 – Now **Research Intern**, *Seed*, Bytedance, advised by Dr. Jiecao Chen and Dr. Yujia Qin.
Research on agent system for complex search and reasoning with reinforcement learning.

May 2024 – Nov 2024 **Research Intern**, *Microsoft Research Asia*, advised by Dr. Xingxing Zhang.
Research on prefernece optimization for reasoning from pseudo feedback.

Apr 2022 – Jul 2022 **Intern**, *Langboat Technology*, advised by Yulong Wang and Dr. Ming Zhou.
Working on complex reasoning and financial text-to-SQL competition.

Jul 2020 – Feb 2021 **Research Intern**, *Damo Academy*, Alibaba Group, advised by Dr. Feng-Lin Li and Dr. Feng Ji.
Research on Self-supervised pre-training for machine reasoning.

Oct 2018 – Sep 2019 **Research Intern**, *CoAI Group*, Tsinghua University, advised by Prof. Minlie Huang.
Research on machine reading comprehension and dialogue state tracking.

Research Interest

- **Agentic System:** Build strong agentic systems able to finish real world tasks through diverse tools, such as code interpreter, virtual machine, and search engine.
- **Machine Reasoning:** Build intelligent systems to facilitate complex reasoning in various domains, like competition-level programming, logical reasoning, and math.
- **Data Synthesis:** Discover various supervision signals from unlabeled data, or synthesize training data from general models to construct reliable feedback for reinforcement learning.

Project

2026 **Seed2.1**, *https://seed.bytedance.com/en/seed2_1*.
Seed2.1 brings major improvements to both general agents and code engineering. I'm in charge of the overall agentic RL training for model release, including search agent, coding agent, and knowledge work agent.

2026 **Seed2.0**, *https://seed.bytedance.com/en/seed2*.
Seed2.0 has been systematically optimized to meet the requirements of large-scale production deployment, and is designed to help tackle complex real-world tasks. I'm in charge of the post-training for search agent and coding agent.

2025 **Seed1.8**, *https://seed.bytedance.com/en/seed1_8*.
We present Seed1.8, a model designed for generalized real-world agency. I'm in charge of the RL training for agentic scenarios. We have achieved 67.6 on BrowseComp, 40.9 on HLE (w/ hybrid tools), and 63.8 on WideSearch.

2025 **Agent for Complex Problem Solving**, *https://tinyurl.com/fangkai-s1-search*.
Develop agent system able to employ diverse tools, including search engine, virtual machine, code interpreter, to solve real world tasks. The representative observation benchmark includes BrowseComp, Terminal Bench, and MCP Park.

2025 **Benchmark for Debugging and Test Case Generation**.
Develop a scalable benchmark to evaluate the ability of LLMs to find potential bugs inside a programming and generate valid test cases for debugging.

2024 **Benchmark Structural Instruction Following**, *https://github.com/SparkJiao/StructTest*.
Develop automatic synthetic tasks to evaluate the instruction following capability of LLMs and reasoning capability as a scalable proxy. I'm responsible for the data synthesis and evaluation for code-based subtasks.

2024 **Post-training on Large-scale Synthetic Data**, *https://tinyurl.com/fangkai-pfpo*.
Synthesize large-scale post-training data for mathematical reasoning and programming to develop stronger specialized LLM. I mainly contribute to automatic test case construction and training.

2024 **Process-DPO**, *https://github.com/SparkJiao/dpo-trajectory-reasoning*.
The source code for our EMNLP paper, ProcessDPO for reasoning, featured with implementations of PPO, GRPO, and DPO, with tensor parallel for large scale training.

2024 **Pipeline Parallel Training of Llama**, *https://github.com/SparkJiao/llama-pipeline-parallel*.
One prototype repository and tutorial for Deepspeed's pipeline parallelism.

2023 **Panda LLM**, *https://github.com/dandelionsllm/pandallm*, 1.1k Stars.
One of the earliest open-sourced projects for continue pre-training of Llama on Chinese corpus. It includes models ranging from 7B to 65B, supported by various training techniques such as QLoRA and pipeline parallelism.

Research

Selected Work

2025 **Fangkai Jiao**, Geyang Guo, Xingxing Zhang, Nancy F. Chen, Shafiq Joty, and Furu Wei. Preference optimization for reasoning with pseudo feedback. In *ICLR*, 2025. **Spotlight**.

2025 Zixuan Ke, **Fangkai Jiao**, Yifei Ming, Xuan-Phi Nguyen, Austin Xu, Do Xuan Long, Minzhi Li, Chengwei Qin, Peifeng Wang, Silvio Savarese, Caiming Xiong, and Shafiq Joty. A survey of frontiers in llm reasoning: Inference scaling, learning to reason, and agentic systems. *TMLR*, 2025. Survey Certificate.

2024 **Fangkai Jiao**, Zhiyang Teng, Bosheng Ding, Zhengyuan Liu, Nancy F. Chen, and Shafiq Joty. Exploring self-supervised logic-enhanced training for large language models. In *NAACL*, 2024.

2024 **Fangkai Jiao**, Chengwei Qin, Zhengyuan Liu, Nancy F. Chen, and Shafiq Joty. Learning planning-based reasoning with trajectory collection and process rewards synthesizing. In *EMNLP*, 2024. Awarded with **Outstanding Paper Award**.

2024 Xingxuan Li, Weiwen Xu, Ruochen Zhao, **Fangkai Jiao**, Shafiq Joty, and Lidong Bing. Can we further elicit reasoning in llms? critic-guided planning with retrieval-augmentation for solving challenging tasks. In *ACL*, 2024.

2024 Yanyang Guo, **Fangkai Jiao**, Zhiqi Shen, Liqiang Nie, and Mohan S. Kankanhalli. UNK-VQA: A dataset and A probe into multi-modal large models' abstention ability. *IEEE TPAMI*, 2024.

2024 Hailin Chen*, **Fangkai Jiao***, Mathieu Ravaut*, Nawshad Farruque*, Xuan-Phi Nguyen*, Chengwei Qin, Manan Dey, Bosheng Ding, Caiming Xiong, Shafiq Joty, and Yingbo Zhou. StructTest: Benchmarking llms' reasoning through compositional structured outputs. *Arxiv*, 2024. Under Review.

2023 **Fangkai Jiao**, Yangyang Guo, Minlie Huang, and Liqiang Nie. Enhanced multi-domain dialogue state tracker with second-order slot interactions. *IEEE ACM TASL*, 2023.

2022 **Fangkai Jiao**, Yangyang Guo, Xuemeng Song, and Liqiang Nie. MERIt: Meta-path guided contrastive learning for logical reasoning. In *Findings of ACL*, 2022.

2021 **Fangkai Jiao**, Yangyang Guo, Yilin Niu, Feng Ji, Feng-Lin Li, and Liqiang Nie. REPT: bridging language models and machine reading comprehension via retrieval-based pre-training. In *Findings of ACL/IJCNLP*, 2021.

2021 Liqiang Nie, **Fangkai Jiao**, Wenjie Wang, Yinglong Wang, and Qi Tian. Conversational image search. *IEEE TIP*, 2021.

2020 Yilin Niu*, **Fangkai Jiao***, Mantong Zhou, Ting Yao, Jingfang Xu, and Minlie Huang. A self-training method for machine reading comprehension with soft evidence extraction. In *ACL*, 2020.

Peer-Reviewed Publications

2025 Yangyang Guo, **Fangkai Jiao**, Liqiang Nie, and Mohan Kankanhalli. The vllm safety paradox: Dual ease in jailbreak attack and defense. In *NeurIPS*, 2025.

2024 Bin Wang, Zhengyuan Liu, Xin Huang, **Fangkai Jiao**, Yang Ding, AiTi Aw, and Nancy Chen. Seaeval for multilingual foundation models: From cross-lingual alignment to cultural reasoning. In *NAACL*, 2024.

2024 Mathieu Ravaut*, Bosheng Ding*, **Fangkai Jiao**, Hailin Chen, Xingxuan Li, Ruochen Zhao, Chengwei Qin, Caiming Xiong, and Shafiq Joty. How much are llms contaminated? A comprehensive survey and the llmsanitize library. *TMLR*, 2024.

2024 Chengwei Qin*, Wenhan Xia*, Tan Wang*, **Fangkai Jiao**, Yuchen Hu, Bosheng Ding, Ruirui Chen, and Shafiq Joty. Relevant or random: Can llms truly perform analogical reasoning? In *ACL*, 2024.

2023 Ruochen Zhao, Hailin Chen, Weishi Wang, **Fangkai Jiao**, Do Xuan Long, Chengwei Qin, Bosheng Ding, Xiaobao Guo, Minzhi Li, Xingxuan Li, and Shafiq Joty. Retrieving multimodal information for augmented generation: A survey. In *Findings of EMNLP*, 2023.

2023 Chengwei Qin, Wenhan Xia, **Fangkai Jiao**, and Shafiq Joty. Improving in-context learning via bidirectional alignment. In *ACL*, 2023.

2022 Weili Guan, **Fangkai Jiao**, Xuemeng Song, Haokun Wen, Chung-Hsing Yeh, and Xiaojun Chang. Personalized fashion compatibility modeling via metapath-guided heterogeneous graph learning. In *SIGIR*, 2022.

Preprint and Technical Report

2024 Mengzhao Jia, Zhihan Zhang, Wenhao Yu, **Fangkai Jiao**, and Meng Jiang. Describe-then-reason: Improving multimodal mathematical reasoning through visual comprehension training. *Arxiv*, 2024.

2023 **Fangkai Jiao**, Bosheng Ding, Tianze Luo, and Zhanfeng Mo. Panda LLM: training data and evaluation for open-sourced chinese instruction-following large language models. *Technical Report*, 2023.

2023 Hailin Chen*, **Fangkai Jiao***, Xingxuan Li*, Chengwei Qin*, Mathieu Ravaut*, Ruochen Zhao*, Caiming Xiong, and Shafiq Joty. Chatgpt's one-year anniversary: Are open-source large language models catching up? *Arxiv*, 2023.

**** denotes for equal contribution***.

Services

- Reviewer for NeurIPS, COLM, *ACL (ARR), ACM MM.
- Reviewer for IEEE/ACM TASL, IEEE TKDE, IEEE TMM.

Awards

2022 – 2026 Singapore International Graduate Award (SINGA), *by* Agency for Science, Technology & Research (A*STAR)

2021 Dean's Scholarship, *by* School of Computer Science and Technology, Shandong University
2018 Dean's Scholarship, *by* School of Software, Shandong University
2017 Bronze Medal in ACM-ICPC Asia Regional Contest, Urumqi Site, *by* ICPC
2017 Silver Medal in ACM-ICPC Asia Regional Contest, Qingdao Site, *by* ICPC
2016 Bronze Medal in ACM-ICPC Asia Regional Contest, China-Final, *by* ICPC
2016 Silver Medal in the ACM-ICPC Asia Regional Contest, Qingdao Site, *by* ICPC
2016 National Scholarship, *by* Ministry of Education of China