

Fangkai Jiao

Education

- Aug 2022 **Ph.D. Candidate, Computer Science and Engineering, Nanyang Technological University.**
– present Advisor: *Prof. Shafiq Joty, Prof. Nancy. F. Chen, and Prof. Aixin Sun.*
- Sep 2019 **M.Phil, Computer Science and Technology, Shandong University.**
– Jun 2022 Advisor: *Prof. Liqiang Nie and Prof. Xuemeng Song.*
- Sep 2015 **B.Eng, Software Engineering, Shandong University.**
– Jun 2019 Undergraduate Thesis Advisor: *Prof. Minlie Huang and Prof. Liqiang Nie.*

Experience

- Mar 2025 **Research Intern, Seed, Bytedance, Advised by Dr. Jiecao Chen.**
– Now Research on agent system.
- May 2024 **Research Intern, Microsoft Research Asia, advised by Dr. Xingxing Zhang.**
– Nov 2024 Research on preference optimization for reasoning from pseudo feedback.
- Apr 2022 **Intern, Langboat Technology, advised by Yulong Wang and Dr. Ming Zhou.**
– Jul 2022 Working on complex reasoning and financial text-to-SQL competition.
- Jul 2020 **Research Intern, Damo Academy, Alibaba Group, advised by Dr. Feng-Lin Li and Dr. Feng Ji.**
– Feb 2021 Research on Self-supervised pre-training for machine reasoning.
- Oct 2018 **Research Intern, CoAI Group, Tsinghua University, advised by Prof. Minlie Huang.**
– Sep 2019 Research on machine reading comprehension and dialogue state tracking.

Research Interest

- **Large Language Model:** General problems of (Multimodal) Large Language Models, like safety and alignment.
- **Machine Reasoning:** How to build more intelligent systems to facilitate complex reasoning in various domains, like competition-level programming, logical reasoning, and math.
- **Weak/self-supervised Learning:** How to discover various supervision signals from unlabeled data, or synthesise training data from general models to construct reliable feedback.

Project

- 2024 **Benchmark Structural Instruction Following.**
Develop automatic synthetic tasks to evaluate the instruction following capability of LLMs. I'm responsible for the data collection and evaluation for code-based subtasks.
- 2024 **Post-training on Large-scale Synthetic Data.**
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. *Arxiv*, 2025. Under Review.
- 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 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

- 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.
- 2023 Ruo Chen 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.
- 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 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. *Arxiv*, 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? *Arxiv*, 2024.
- 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. *Arxiv*, 2024.
- 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.
- 2024 Yangyang Guo, **Fangkai Jiao**, Liqiang Nie, and Mohan Kankanhalli. The vllm safety paradox: Dual ease in jailbreak attack and defense. *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 Chengwei Qin, Wenhan Xia, **Fangkai Jiao**, and Shafiq Joty. Improving in-context learning via bidirectional alignment. *Arxiv*, 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 COLM, *ACL, ARR, ACM MM.
- Reviewer for IEEE/ACM TASL, IEEE TKDE, IEEE TMM.

Awards

- 2022 Singapore International Graduate Award (SINGA), *by* Agency for Science, Technology & Research – present (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