Haotian Sun

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Research Interests: Large Language Models; Planning; Adaptation

Education

Georgia Institute of Technology Fall 2023 - Present
Ph.D. Student in Machine Learning (ML) *Atlanta, GA*
Co-advised by Dr. Bo Dai and Dr. Chao Zhang

Georgia Institute of Technology | *GPA – 4.0/4.0* Fall 2022 - Spring 2023
Master of Science in Computational Science and Engineering (CSE) *Atlanta, GA*

École CentraleSupélec | *GPA – 3.9/4.0* Fall 2015 – Summer 2017
Engineer's Degree (Diplôme d'Ingénieur) from the Dual Degree Program *Paris, France*

Xi'an Jiaotong University | *Percentage Grade – 91/100* Fall 2013 – Summer 2020
Honors Youth Program in Electrical Engineering *Xi'an, China*
Highly selective nationwide program accepting under 120 students annually.

Research

BBox-Adapter: Lightweight Adapting for Black-Box Large Language Models Fall 2023
Georgia Institute of Technology *Atlanta, GA*
- Proposed an effective adapting approach for Black-Box LLMs, which offers a transparent, privacy-conscious, and cost-effective solution for customizing commercial black-box LLMs with only APIs;
- Designed an online adaptation framework iteratively sampling from previous inferences and optimizing the backend lightweight adapter (up to 0.3B);
- Achieved 5.90% improvement over the base model with 31.30 times less training cost and 1.84 times less inference cost than the official SFT service.

AdaPlanner: Adaptive Planning from Feedback with Language Models Spring 2023
Georgia Institute of Technology *Atlanta, GA*
- Proposed AdaPlanner, a closed-loop planning approach allowing the LLM agent to refine its self-generated plan adaptively in response to environmental feedback;
- Developed a code-style LLM prompt structure that facilitates plan generation across a variety of tasks;
- Designed a skill discovery mechanism that leverages successful plans as few-shot exemplars, boosting sample efficiency by up to 600x.

ToolQA: A Dataset for LLM Question Answering with External Tools Spring 2023
Georgia Institute of Technology *Atlanta, GA*
- Proposed a new dataset to faithfully evaluate LLMs' ability to use external tools for question answering;
- Minimized the overlap between our benchmark data and LLMs' pre-training data, enabling a more precise evaluation of LLMs' tool-use reasoning abilities;
- Conducted an in-depth diagnosis of existing tool-use LLMs to highlight their strengths, weaknesses, and potential improvements.

Autoregressive Diffusion Model for Graph Generation Fall 2022
Georgia Institute of Technology *Atlanta, GA*
- Designed a diffusion network that learns an optimal node absorbing ordering from graph topology and a denoising network that uses the reverse node order to reconstruct the graph efficiently;
- Achieved better generation performance than previous state-of-the-art and guaranteed fast generation speed.

Publications

[1] **H. Sun**, Y. Zhuang, W. Wei, C. Zhang, B. Dai, BBox-Adapter: Lightweight Adapting for Black-Box Large Language Models, *arXiv e-prints*, 2024.
[2] **H. Sun**, Y. Zhuang, L. Kong, B. Dai, C. Zhang, AdaPlanner: Adaptive Planning from Feedback with Language Models, *Conference on Neural Information Processing Systems (NeurIPS)*, 2023.
[3] L. Kong, **H. Sun**, Y. Zhuang, H. Wang, C. Zhang. Two Birds with One Stone: Enhancing Calibration and Interpretability with Graph Functional Neural Process, *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2024.
[4] Y. Zhuang, Y. Yu, K. Wang, **H. Sun**, C. Zhang. ToolQA: A Dataset for LLM Question Answering with External Tools, *Conference on Neural Information Processing Systems (NeurIPS)*, 2023.
[5] L. Kong, J. Cui, **H. Sun**, Y. Zhuang, B. A. Prakash, and C. Zhang. Autoregressive Diffusion Model for Graph Generation, *International Conference on Machine Learning (ICML)*, 2023.