Zhihong Shao

E-mail: zhshaothu@gmail.com
Phone: +86 13121259158
Web: https://ZhihongShao.github.io

Research Interests

My interests are in natural language processing and deep learning. I am particularly interested in how we can build a robust and scalable AI system that can leverage diverse skills (e.g., tool use and reasoning) to aggregate possibly-heterogeneous information and answer natural language questions precisely regardless of their complexity. My research mainly focused on **faithful reasoning, recently in the context of utilizing large language models**. My work spans across (i) **knowledge-grounded generation** [7][3], (ii) **tool-augmented reasoning** [1][8][2][5], (iii) robust classification and text matching (e.g., paraphrase detection and natural language inference) [4].

Education

Tsinghua University, Beijing, China — September 2019 - Present
Ph.D. Student, Computer Science and Technology
Advisor: Minlie Huang

Beihang University, Beijing, China — September 2015 – July 2019
B.E., Computer Science and Technology
GPA: 3.86/4, *Rank:* 2/213

Publications

[1] Synthetic Prompting: Generating Chain-of-Thought Demonstrations for Large Language Models
Zhihong Shao, Yeyun Gong, Yelong Shen, Minlie Huang, Nan Duan, and Weizhu Chen
International Conference on Machine Learning (ICML), 2023.

[2] Chaining Simultaneous Thoughts for Numerical Reasoning
Zhihong Shao, Fei Huang, and Minlie Huang
Findings of Empirical Methods in Natural Language Processing (Findings of EMNLP), 2022.

[3] Answering Open-Domain Multi-Answer Questions via a Recall-then-Verify Framework
Zhihong Shao, and Minlie Huang
Annual Meeting of the Association for Computational Linguistics (ACL), 2022.
(Best QA system on the AmbigNQ leaderboard)

[4] AdvExpander: Generating Natural Language Adversarial Examples by Expanding Text
Zhihong Shao, Zhongqin Wu, and Minlie Huang
IEEE/ACM Transactions on Audio, Speech, and Language Processing (TASLP), vol. 30, pp. 1184-1196, 2022.

[5] A Mutual Information Maximization Approach for the Spurious Solution Problem in Weakly Supervised Question Answering
Zhihong Shao, Lifeng Shang, Qun Liu, and Minlie Huang
Annual Meeting of the Association for Computational Linguistics (ACL), 2021.

[6] Long and Diverse Text Generation with Planning-based Hierarchical Variational Model
Zhihong Shao, Minlie Huang, Jiangtao Wen, Wenfei Xu, and Xiaoyan Zhu
Empirical Methods in Natural Language Processing (EMNLP), 2019.

Preprint

[7] Enhancing Retrieval-Augmented Large Language Models with Iterative Retrieval-Generation Synergy
Zhihong Shao, Yeyun Gong, Yelong Shen, Minlie Huang, Nan Duan, Weizhu Chen
Arxiv abs/2305.15294, 2023.

[8] CRITIC: Large Language Models Can Self-Correct with Tool-Interactive Critiquing
Zhibin Gou, **Zhihong Shao**, Yeyun Gong, Yelong Shen, Yujiu Yang, Nan Duan, Weizhu Chen
Arxiv abs/2305.11738, 2023.

[9] CoTK: An Open-Source Toolkit for Fast Development and Fair Evaluation of Text Generation
Fei Huang, Dazhen Wan, **Zhihong Shao**, Pei Ke, Jian Guan, Yilin Niu, Xiaoyan Zhu, and Minlie Huang
Arxiv abs/2002.00583, 2020.

Research Experience

CoAI Lab, Tsinghua University Sep 2019-Present, Beijing, China
Ph.D. Student (Supervisor: Minlie Huang)
Worked on open-domain multi-answer question answering [3], neuro-symbolic reasoning [2][5], robust classification and text matching [4], and data-to-text generation [6].

Microsoft Research Asia Sep 2022-Present, Beijing, China
Research Intern (Supervisors: Yeyun Gong, Nan Duan, Yelong Shen, Weizhu Chen)
Worked on (1) synthetic prompting [1] which aims to elicit better reasoning in large language models with model-synthesized chain-of-thought demonstrations; (2) Iter-RetGen [7] which synergizes retrieval and generation; (3) Critic [8] which teaches LLMs to correct themselves via interactions with tools.

Huawei Noah's Ark Lab Jun 2020-Oct 2020, Shenzhen, China
Research Intern (Supervisors: Lifeng Shang, Qun Liu)
Worked on a weakly-supervised training algorithm [5] that is applicable to a wide range of neuro-symbolic reasoning models, which selects high-quality symbolic reasoning processes for training via mutual information maximization.

Awards

1st Prize, Comprehensive Scholarship, Tsinghua University 2022
2nd Prize, Comprehensive Scholarship, Tsinghua University 2021
3rd Prize, the National Final of "LAN QIAO CUP" C/C++ Group 2018
China National Scholarship 2017
1st Prize, National College Students Mathematics Competition (non-math-major) 2016
China National Scholarship 2016

Services

Reviewer/Program Committee: ACL, EMNLP, NLPCC, ARR

Teaching Assistant

Artificial Neural Network Fall 2019 - 2022
Instructor: Minlie Huang

Object-Oriented Programming Spring 2020 - 2023
Instructor: Minlie Huang
Also gave guest lectures and made assignments