JIALE LAO

⌂ https://solidlao.github.io/ ⊙ SolidLao ✉ laojiale@stu.scu.edu.cn

≔ EDUCATION

Cornell University, Department of Computer Science　　　　　　　　**Start in August 2024**

PhD in Computer Science　　　　　　　　　　　　　　　　　　　　　　　　*Ithaca, NY*

- Advisor: Prof. Immanuel Trummer

Sichuan University, Department of Computer Science　　　　　　　**August 2020 - June 2024**

B.Eng in Software Engineering　　　　　　　　　　　　　　　　　　　　　　*Sichuan, China*

- GPA: 3.89/4 (Rank: 6/213)
- Advisor: Prof. Mingjie Tang

≔ PUBLICATIONS

GPTuner: A Manual-Reading Database Tuning System via GPT-Guided Bayesian Optimization

- **Jiale Lao**, Yibo Wang, Yufei Li, Jianping Wang, Yunjia Zhang, Zhiyuan Chen, Wanghu Chen, Mingjie Tang, Jianguo Wang
- Under revision, **VLDB** 2024

PathBee: A Generic Optimization Framework for Efficient Distance Labeling

- **Jiale Lao**, Yinghao Tang, Tingfeng Lan, Mingjie Tang, Yuanchuan Zhou, Jianguo Wang
- In submission, **VLDB** 2024

≔ RESEARCH EXPERIENCE

Automatic Optimization of Database with Large Language Model 🔗　　　**May 2023 – Present**

Advisors: Prof. Jianguo Wang (Purdue); Prof. Mingjie Tang (SCU)　　　　　**Project Leader**

- Designed and implemented GPTUNER, a novel manual-reading database tuning system that leverages domain knowledge automatically and extensively to enhance the knob tuning process.
- Developed a LLM-based data pipeline, a prompt ensemble algorithm, a workload-aware and training-free knob selection strategy, and a Coarse-to-Fine Bayesian Optimization framework.
- Experimentally evaluated GPTUNER under different benchmarks, metrics and DBMS. Compared to the state-of-the-arts, GPTUNER identifies better configurations in **16x** less time on average and achieves **30%** performance improvement over the **best-performing** alternative.
- Project outcome: a paper under revision of **VLDB 2024**, an open-source project with more than **3000 views, 200 clones and 46 stars** on GitHub.

Distance Indexing Optimization via Graph Neural Network 🔗　　　**October 2022 – Present**

Advisors: Prof. Jianguo Wang (Purdue); Prof. Mingjie Tang (SCU)　　　　　**Project Leader**

- Developed PATHBEE, a generic optimization framework to achieve efficient distance labeling.
- Provided a solid theoretical analysis to reveal a performance degradation factor shared by existing methods, proved it is NP-hard to find the optimal vertex traversal order, and identify the best-performing ranking method via a formal modeling of indexing process.
- Developed an effective GNN-based approach to rank the vertices, proposed a novel sampling strategy to further enhance this approach.
- Extensive experiments on 26 real-world datasets shows that PATHBEE achieves substantial reductions in indexing time (up to **21.49 times**), index size (up to **5.78 times**), and query time (up to **2.18 times**).
- Project outcome: a paper in submission to **VLDB 2024**.

≔ OTHERS

Service: subreviewer of VLDB 2024 and ICDE 2024

Programming Languages: Python, Rust, Go, C/C++, SQL, Java