Yiming Qiao

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I am a Phd student at Tsinghua University. My research interest is in database management systems. I have particular interests in vectorized execution, query optimization, and data compression.

EDUCATION

Tsinghua University Sept. 2021 - Jun. 2026
Ph.D. in Computer Science (Institute for Interdisciplinary Information Sciences, IIIS) *Beijing, China*

GPA: 3.76/4.00, Advisor: Huanchen Zhang (huanchen@tsinghua.edu.cn)

Nanjing University of Posts and Telecommunications Sept. 2017 - Jun. 2021
B.Eng. in Computer Science, with Honors Degree (Top 3%) *Nanjing, China*

GPA: 92.9/100

EXPERIENCE

Visiting Student Feb. 2025 - Present
Centrum Wiskunde & Informatica *Amsterdam, Netherlands*

Advisor: Peter Boncz

Software Engineering Intern Sept. 2020 - Nov. 2020
eBay *Shanghai, China*

Software Engineering Intern Nov. 2019 - May 2020
Oracle *Nanjing, China*

Exchange Student Sept. 2018 - Jun. 2019
Nanjing University *Nanjing, China*

RESEARCH PROJECTS

Robust Query Execution Engine in DuckDB Feb. 2025 - Present

Advisor: Peter Boncz, Huanchen Zhang

Developing the next-generation query execution engine for DuckDB, leveraging robust predicate transfer. This ongoing work builds on the promising results of robust predicate transfer (SIGMOD'25) to address the classic cardinality estimation problem and enhance query execution.

Data Chunk Compaction Aug. 2023 - Nov. 2024

Advisor: Huanchen Zhang

Revealed the small chunk problem in vectorized execution, where filters and hash joins can reduce the valid tuples in a data chunk, leading to performance degradation. Addressed this issue by modeling the chunk compaction problem and designing various strategies. Implemented in DuckDB, our solution achieved up to a 63% speedup on standard benchmarks.

This work is published in SIGMOD'25.

Relational Table Compression Feb. 2021 - May 2024

Advisor: Yihan Gao, Huanchen Zhang

Developed Blitzcrank, a high-speed compressor for OLTP databases, reducing memory usage by 85% with only a 19% performance impact. Addressed challenges in compressing dynamic row-stores by introducing novel semantic models and a fast encoding technique named "Delayed Coding", improving both speed and efficiency for large datasets.

This work is published in VLDB'24.

Neural Network-Based Spectrum Deblurring Jul. 2018 - Dec. 2019

Advisor: Hu Zhu

Developed an end-to-end neural network framework for spectrum deconvolution in infrared spectrometers, addressing issues of band overlap and noise in aging instruments. The method, using dilated convolutions and self-paced learning, outperformed traditional partial differential equation (PDE) approaches, improving spectral reconstruction.

This work is published in IEEE Transactions on Industrial Informatics.

PUBLICATIONS

[1] **Yiming Qiao**, Huanchen Zhang, "Data Chunk Compaction in Vectorized Execution," In: Proceedings of the ACM on Management of Data (**SIGMOD'25**), 3(1): Article 26, 25 pages.

[2] **Yiming Qiao**, Yihan Gao, Huanchen Zhang, "Blitzcrank: Fast Semantic Compression for In-memory Online Transaction Processing," In: *Proceedings of the VLDB Endowment* (**VLDB'24**) 17, no. 10, pp. 2528 - 2540.

[3] Hu Zhu*, **Yiming Qiao***, Guoxia Xu, Lizhen Deng, and Yu-Feng Yu. "DSPNet: A Lightweight Dilated Convolution Neural Networks for Spectral Deconvolution with Self-paced Learning." In: *IEEE Transactions on Industrial Informatics* (**TII**) 16, no. 12 (2019): 7392-7401. (*Equal Contribution)

[4] Huihui Wang, Shunmei Meng, **Yiming Qiao**, and Jing Zhang. "Fast Classification Algorithms via Distributed Accelerated Alternating Direction Method of Multipliers." In: *Proceedings of 2019 IEEE International Conference on Data Mining* (**ICDM'19**), Nov. 2019, pp. 1354 - 1359.

Patents

[1] Xingguo Chen, **Yiming Qiao**, Wei Liu, Jie Zhu, "A User-Oriented Method for Enhancing Custom Sports Commentary." Patent CN202010284204.8, China, Filed Apr. 2020, Granted Sept. 2023.

[2] Zhiqiang Zou, linrui Li, Shuyu Chang, **Yiming Qiao**, "A Classification Method for Outlier Celestial Objects Based on Astronomical Spectral Data." Patent CN202010983397.6, China, Filed Sept. 2020, Granted Nov. 2024.

OTHERS

Awards

- Mitacs Globalink Research Internship, 2020.
- Bell Honors School Graduate Gold Medal, Nanjing University of Posts and Telecommunications, 2020.

Teaching

- Teaching Assistant - Quantitative Investment and Financial Optimization (Tsinghua 80470273) - Fall 2023
- Teaching Assistant - Data Mining (Tsinghua 40470333) - Fall 2021