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 Information Security, with Honors Degree (Top 3%) *Nanjing, China*

GPA: 92.9/100

EXPERIENCE

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

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 accepted by SIGMOD'24.

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," **SIGMOD'25**, Accepted.

[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.

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