

Tang Qian

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EDUCATION

Zhejiang University

M.S., Computer Science and Technology

- Research focus: Vector Search, Distributed Systems, Big Data Analysis

Hangzhou, China

Sep. 2023 - Present

Southwest Jiaotong University

B.S., Computer Science

- Research focus: Spatio-temporal data analysis and graph neural networks

Chengdu, China

Sep. 2019 - Jun. 2023

PROFESSIONAL EXPERIENCE

High-Dimensional Distributed Graph Index

Submitting to VLDB 2026

2025 - Present

Zhejiang University

- Architected **DGI**, a distributed graph-based indexing system integrating graph retrieval efficiency with tree-based boundary management, achieving billion-scale high-dimensional vector search with balanced memory and computational load.
- Proposed a **boundary-aware balanced partitioning strategy**, effectively reducing cross-partition communication overhead by **67%** while maintaining workload balance.
- Designed a **hierarchical index architecture** combining sparse global navigation, fine-grained local precision graphs, and specialized tree management for boundary nodes, achieving **99% recall** under low-latency conditions.
- Developed a distributed **multi-entry parallel search framework** with dynamic entry selection, increasing query throughput by **4.3x** and reducing latency by up to **80%** in high-concurrency environments.

Distributed Indexing for Metric Space

Accepted by TKDE 2025

2023 - 2024

Zhejiang University

- Proposed **DIMS**, a distributed metric index framework bridging the efficiency-accuracy gap for heterogeneous data similarity search.
- Designed a **three-layer partitioning algorithm**, reducing workload imbalance by **72%** while preserving global pruning efficiency.
- Developed an **adaptive multi-layer indexing hierarchy** for intelligent query routing through global, intermediate, and local layers to minimize redundant computation.
- Built a **theoretical cost optimization model** that interprets and tunes system parameters based on data distribution and network conditions.
- Demonstrated **2x lower range query latency** and **50x faster k-NN search** compared to state-of-the-art solutions.

Multi-Modal Data Similarity Search Framework

Accepted by SIGKDD 2026

2024 - 2025

Zhejiang University

- Developed **OneDB**, a distributed multi-metric similarity search framework for efficient and accurate multi-modal data processing.
- Designed a **lightweight modality weight learning model** to capture inter-modality relationships and enable personalized queries with limited training samples.
- Proposed a **multi-modal distributed dual-layer indexing strategy** combining data and modality-based partitioning for efficient load balancing.
- Created an **end-to-end parameter auto-tuning module** powered by deep reinforcement learning to optimize system performance under dynamic computational environments.
- Extensively evaluated on real-world datasets, achieving **2.5-5.75x speedup** over existing methods and improving accuracy by **12.63%-30.75%** compared to vector database systems.

Query-aware Vector Database System

Accepted by TKDE 2026

2024 - 2025

Zhejiang University

- Developed **QBase**, a query-aware vector search system that optimizes performance by leveraging query vector similarities.
- Designed an **enhanced A3V-tree indexing structure** for efficient processing of multi-vector search tasks.
- Implemented a **similarity threshold algorithm** based on dataset distribution characteristics.
- Engineered a comprehensive system supporting **six vector query types** with a cost-based query plan selection mechanism.

Graph-based Traffic Forecasting Framework

2021 - 2022

Accepted by IJCNN 2022

Southwest Jiaotong University

- Proposed a novel **Spatio-Temporal Latent Graph Structure Learning (ST-LGSL)** network, significantly improving traffic prediction accuracy.
- Designed the **MLP-kNN graph generator**, integrating geographical data and node similarity to model complex traffic networks.
- Achieved **state-of-the-art results** on METR-LA and PEMS08 datasets, surpassing leading benchmarks.

PUBLICATIONS

Tang Qian, Yifan Zhu, Lu Chen, Xiangyu Ke, Tianyi Li, and Christian Jensen. *OneDB: A Distributed Multi-Metric Data Similarity Search System. Proceedings of the 32nd ACM SIGKDD Conference on Knowledge Discovery and Data Mining V.2 (SIGKDD)*, pp. 4024–4033, 2026.

Boyu Tan, **Tang Qian**, Ziquan Fang, Lu Chen, Mengzhao Wang, Qilong Wang, and Jingwen Zhao. *QBase: A Query Aware Vector Search System. IEEE Transactions on Knowledge and Data Engineering (TKDE)*, 2026.

Yifan Zhu, Chengyang Luo, **Tang Qian**, Lu Chen, Yunjun Gao, and Baihua Zheng. *DIMS: Distributed Index for Similarity Search in Metric Spaces. IEEE Trans. Knowledge Data Eng. (TKDE)*, 2024.

Jiabin Tang, **Tang Qian**, Shijing Liu, Shengdong Du, Jie Hu, and Tianrui Li. *Spatio-Temporal Latent Graph Structure Learning for Traffic Forecasting. International Joint Conference on Neural Networks (IJCNN)*, 2022.

INTERNSHIP EXPERIENCE

- Ant Group, Algorithm Intern, June–September 2025. Worked on mining associations among high-dimensional user tags for billion-scale users, and inferring event representation relationships via graph computing.

ACADEMIC EXPERIENCE

- Oral Presentation in IJCNN 2022, Padua, Italy, July 18-23, 2022
- Participant in the 22nd China Computer Federation (CCF) Summer School on Chinese Databases

SELECTED AWARDS AND HONORS

Graduate Awards - Zhejiang University

- Huawei Elite Scholarship (Top 2%), 2023
- First Prize in 2024 CCF China Database Summer Competition
- Outstanding Graduate Student, 2023
- Excellent Graduate Student Leader, 2023
- Outstanding Youth League Member, 2023

Undergraduate Awards - Southwest Jiaotong University

- Outstanding Graduate of Sichuan Province, 2023
- Sishi Yanghua Medal of Southwest Jiaotong University (Top 0.1%), 2022
- First-class Scholarship of Leeds School (2021-2022), 2022
- Outstanding Youth League Cadre of Southwest Jiaotong University, 2022
- Exemplary Outstanding Student of Southwest Jiaotong University, 2021
- First-class Scholarship of Leeds School (2020-2021), 2021
- University-level Model League Branch Honor, 2021
- National Scholarship, 2020
- Outstanding Student of Southwest Jiaotong University, 2020

SKILLS & EXTRACURRICULAR INTERESTS

- C++, Scala, Python, Spark, Hadoop, Distributed Computing
- President of Student Union of College of Computer Science and Technology, Zhejiang University, 2023-2024.
- Class Monitor for Software Engineering Class 6, Grade 2023, Zhejiang University, 2023-2025.
- Deputy Secretary of the College League Committee, Southwest Jiaotong University, 2021-2023
- President of the College Student Union, Southwest Jiaotong University, 2021-2022
- Class Monitor for Computer Science Class 1, Grade 2019, Southwest Jiaotong University, 2020-2023