Zhanhao Zhao

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Research Interests

- **Distributed transaction processing**: Concurrency control, serializability theories, high availability
- **Temporal databases**: Built-in temporal support in RDBMSs

Education

- **Renmin University of China** — Beijing, China
  Ph.D. in Computer Science; Advisor: Prof. Xiaoyong Du and Prof. Wei Lu — *Sept. 2017 – Present*
- **Zhongnan University of Economics and Law** — Wuhan, China
  B.E. in Management Information Systems; GPA: 3.62 (Top 3%) — *Sept. 2013 – June. 2017*

Publications

- **Zhanhao Zhao**, Wei Lu, Hongyao Zhao, Zongyan He, Haixiang Li, Anqun Pan, Xiaoyong Du, *T-SQL: A Lightweight Implementation to Enable Built-in Temporal Support in RDBMSs*. IEEE Transactions on Knowledge and Data Engineering (***TKDE***), 2021,***CCF-A***.
- **Zhanhao Zhao**. *Efficiently Supporting Adaptive Multi-Level Serializability Models in Distributed Database Systems*, Proceedings of ***SIGMOD*** **(student abstract)**, 2021,***CCF-A***.
- Wei Lu, **Zhanhao Zhao**, Xiaoyu Wang, Haixiang Li, Zhenmiao Zhang, Zhiyu Shui, Sheng Ye, Anqun Pan, Xiaoyong Du. *A Lightweight and Efficient Temporal Database Management System in TDSQL*, Proceedings of the ***VLDB*** Endowment, 2019, ***CCF-A***.
- Haixiang Li, **Zhanhao Zhao**, Yijian Cheng, Wei Lu, Xiaoyong Du, Anqun Pan. *Efficient time-interval data extraction in MVCC-based RDBMS*, World Wide Web Journal (***WWWJ***), 2019, ***CCF-B***.
- **Zhanhao Zhao**, Feiran Huang, Xiaoli Wang, Wei Lu, Xiaoyong Du, *SQL-Based Solution for Fast Graph Similarity Search*, Journal of Software (***JOS***), 2018, ***CCF-A***. (in Chinese)

Experience

- **Tencent Inc.** — Shenzhen/Beijing, China
  Research Intern; Mentor: Mr. Haixiang Li — *July 2017 - Present*
  - **Enable TDSQL to manage temporal data efficiently**: I (together with Xiaoyu Wang) introduce a lightweight yet efficient built-in temporal implementation into Tencent's distributed database management system, namely TDSQL. More details can be found in our VLDB'19 paper.
  - **Guarantee distributed snapshot isolation in TDSQL**: I develop a plug-in component for TDSQL to support distributed snapshot isolation. This feature has been already integrated into the main branch of TDSQL and provided to customers.
  - **Guarantee multi-level serializability in TDSQL**: I (together with Hongyao Zhao) extend TDSQL to support multi-level serializability, i.e., sequential serializability and strict serializability. We also encapsulate a novel concurrency control protocol called BDTA to improve system performance.
- **Key Laboratory of Data Engineering and Knowledge Engineering (DEKE)** — Beijing, China
  Research and Teaching Assistant — *Sept 2017 - Present*
  - **Research Assistant - Database Group**: I mainly do research works on distributed transaction processing, like designing distributed concurrency control algorithms, ensuring high availability, etc. Currently, I focus on fast transaction failure recovery by leveraging replications in consensus-based NewSQL systems (e.g., CockroachDB, TiDB).
  - **Teaching Assistant - Introduction to Database System / Database System Implementation**: Help Prof. Wei Lu with experiment design. Guide students to implement commonly-used concurrency control protocols, like 2PL, in an in-memory database codebase (forked from DB×1000).

Patents

- Haixiang Li, **Zhanhao Zhao**, Wei Lu, Xiaoyong Du, Anqun Pan, Transaction Processing Method, Approaches, Computing Device, and Storage Medium, CN111338766A, June 2020.
- Haixiang Li, Wei Lu, Xiaoyong Du, **Zhanhao Zhao**, Anqun Pan, Data Retrieval Method, Approaches, Computing Device, and Storage Medium, CN111190935A, August 2020.

Projects

- **WooKongDB**: A consensus-based NewSQL system which we developed by deeply modifying Greenplum. I lead the system design with the guidance of Prof. Wei Lu, while my teammates, e.g., Hongyao Zhao and Su Yu, help with the code.
- **T-SQL**: A build-in temporal implementation on WooKongDB, in which we optimize the temporal data storage thoroughly. We present this work in our TKDE paper (to appear). I am the owner and developer of this project. Our implementation is publicly available via https://github.com/dbiir/T-SQL.
- **3TS**: A distributed concurrency control analysis platform. I am one of the collaborators of this project. 3TS is open-sourced via https://github.com/Tencent/3TS.

Programming Skills

- **Languages**: C, C++, SQL, Java, LaTeX
- **Technologies**: Familiar with the source code of MySQL/PostgreSQL

Honors and Awards

- **National Scholarship for Ph.D Students, China** 2021
- **First-class Student Scholarship, Renmin University of China** 2018/2020
- **Outstanding Graduate Award, Zhongnan University of Economics and Law** 2017
- **National Scholarship for Undergraduate Students, China** 2015
- **First-class Student Scholarship, Zhongnan University of Economics and Law** 2015