Wuwen Wang

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EDUCATION

Carnegie Mellon University December 2020
Master of Science in Electrical and Computer Engineering GPA: 3.87/4.00

University of Illinois at Urbana-Champaign May 2019
Bachelor of Science with Honors in Computer Engineering GPA: 3.67/4.00

RESEARCH EXPERIENCE

Carnegie Mellon Database Group Pittsburgh, Pennsylvania
Research Assistant January 2020-present

- Worked as a developer for the NoisePage in-memory database management system written in C++17
- Implemented parallel CREATE INDEX in the execution engine to support runtime code generation (JIT compilation) for index population using LLVM compiler infrastructure, yielding a speedup in the query execution.
- Experimented on TPC-C benchmark to investigate the effectiveness of indexes, analyze the latency of index creation and indicate that the self-driving model worked correctly on DBMS
- Implemented a compilation manager to manage the query compilation process, and to support an adaptive execution mode that smoothly replaces interpreted code by byte-code asynchronously generated in the background
- Implemented SQL LIKE operator as a runtime generated predicate for SELECT statement and sequential scan
- Added support for constraint creation and enforcement for UNIQUE, Primary Key and Foreign Key, in a Postgres convention to ensure the code compatibility
- Ported over TPC-H Benchmark and Star Schema Benchmark with hard-coded query plans for executable queries
- Fixed correctness issues for multiple predicates in the WHERE clause by analyzing the output from code generation for sequential scan
- Learned and Profiled the database against TPC-C benchmark to detect the bottleneck of the system using PERF

PUBLICATIONS

- L. Ma, W. Zhang, J. Jiao, **W. Wang**, M. Butrovich, W. Lim, P. Menon, A. Pavlo. “MB2: Decomposed Behavior Modeling for Self-Driving Database Management Systems” (Submitted to SIGMOD 2021)
- L. Zhang, M. Butrovich, T. Li, A. Pavlo, Y. Nannapaneni, J. Rollinson, H. Zhang, A. Balakumar, D. Biales, Z. Dong, E. J. Eppinger, J. E. Gonzalez, W. S. Lim, J. Liu, L. Ma, P. Menon, S. Mukherjee, T. Nayak, A. Ngom, D. Niu, D. Patra, P. Raj, S. Wang, **W. Wang**, Y. Yu, and W. Zhang, "Everything is a Transaction: Unifying Logical Concurrency Control and Physical Data Structure Maintenance in Database Management Systems," in CIDR 2021, Conference on Innovative Data Systems Research, 2021.
- Liu, C., Das, A., **Wang, W**., Küchemann, S., Kenesei, P., & Maass, C. R. E. (2019). “Shear-band cavities and strain hardening in a metallic glass revealed with phase-contrast x-ray tomography”. *Scripta Materialia*, 170, 29-33.

PROJECT

Database Systems, Carnegie Mellon University — Pittsburgh, Pennsylvania
Teaching Assistant — August 2020-present

- Worked as a developer for the Bustub relational disk-oriented database system written in C++
- Took a lead to develop the project for a volcano-model execution engine and built the executors from scratch
- Attended the regular staff meetings to discuss course logistics and hosted office hours to help over 90 students

Cloud Computing, Carnegie Mellon University — August 2019-December 2020

- Designed and Implemented Extract, Transform and Load (ETL) process on a large dataset over 1TB using MapReduce and Spark to generate prepared data to optimize performance impact of complex queries on web-servers
- Developed and deployed applications such as Blockchain, User Recommendation and Twitter Impact on fault-tolerant, scalable web-servers and databases to handle high loads

Building Reliable Distributed Systems, Carnegie Mellon University — August 2019-December 2020

- Led a team of 10 to develop a fault-tolerant distributed system that supported both active and passive replications, failure detection, logging, checkpointing and fault recovery
- Learned in-depth overview of designing reliable distributed systems and evaluated the robustness of the system using empirical approaches

Courses

- CMU 11-642 Search Engine
- CMU 15-445 Database Systems (TA)
- CMU 15-721 Advance Database Systems
- CMU 18-749 Building Reliable Distributed Systems
- UIUC ECE 391 Operating System
- UIUC CS 411 Database Systems
- UIUC CS 425 Distributed Systems

HONORS

- The Dean's List of College of Engineering, *Recipient* — August 2017-May 2019
- Earl J. Eckel Scholarship, *Recipient* — April 2017-May 2019

SKILLS

Programing Languages: C++, C, SQL, Python, Java, assembly language, Go, Scala
Languages: Fluent - English, Native - Mandarin