Zhongwei Xu

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RESEARCH INTERESTS

Modern data systems offer an expanding range of choices in software architecture, hardware, and algorithms, yet finding effective designs still requires substantial manual effort. My research explores how to automate this process while accounting for both performance and resource efficiency. I have investigated automated configuration selection in lakehouses and characterized the energy behavior of GPU databases. Building on these foundations, I am exploring agents that discover improved database algorithms and evaluate them efficiently and reliably.

EDUCATION

University of Michigan, Ann Arbor 09/2024–Present

Ph.D. in Computer Science and Engineering (School GPA: 4.0/4.0)

Xi'an Jiaotong University 08/2020–06/2024

B.Eng. in Computer Science & Technology (School GPA: 4.0/4.3)

RESEARCH EXPERIENCES

University of California - Berkeley 10/2023–4/2024

Remote Research Assistant | Advisor: Prof. Aditya Parameswaran

University of Illinois Urbana-Champaign 05/2023–11/2023

Remote Research Assistant | Advisor: Prof. Yun Huang

Purdue University 02/2023–07/2023

Remote Research Assistant | Advisor: Prof. James Davis

PUBLICATIONS

Speed! But at What Cost? Characterizing the Energy Behavior of GPU Databases (Zhongwei Xu, Yuchen Xia, Matteo Interlandi, Rathijit Sen, Nishil Talati, Mosharaf Chowdhury, Lin Ma) — Under revision for VLDB 2027.

LakeHelm: Zero-Shot Lakehouse Advisor for Joint Engine-Format Selection and Configuration (Zhongwei Xu, Siyuan Dong, Haotian Gong, Donna Pham, Lin Ma)

Evaluating Non-AI Experts' Interaction with AI: A Case Study in Library Context (Q. Zheng, M. Chen, H. Park, Zhongwei Xu, Yun Huang)

Synergizing Human-AI Agency: A Guide of 23 Heuristics for Service Co-Creation with LLM-Based Agents (Qingxiao Zheng, Zhongwei Xu, Abhinav Choudhary, Yuting Chen, Yongming Li, Yun Huang)

Systematically Detecting Packet Validation Vulnerabilities in Embedded Network Stacks (P. C. Amusuo, R. A. C. Méndez, Zhongwei Xu, A. Machiry, J. C. Davis)

WORK EXPERIENCE

Tencent | Backend Development Intern 12/2022–02/2023

Supervisor: Zheng Zhong

Applied abstraction, divide-and-conquer, and domain-driven design (DDD) to define service boundaries and decouple business logic, while using probabilistic algorithms for service differentiation and Redis with fine-grained distributed locking to maintain availability at 5,000–8,000 TPS.

Yunqi | Research Intern

Supervisor: Nan Zhang

Developed automated configuration tuning for a lakehouse-style data platform at Yunqi to improve query performance.

SKILLS

Languages/Patterns: C/C++, Java, Python, Scala, Shell, Typescript.

Backend Frameworks/Tools/Middleware: Flink, Redis, Elasticsearch, DuckDB, Postgres, Spark, Hadoop, Trino, Presto, Hive.