Mingzhuo Yin

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Education

Xi'an Jiaotong University (XJTU) | **Computer Science** **Undergraduate Student**

Major GPA: 86.27/100 Sep 2022 – July 2026 (Expected)

Research Experience

Institute of Artificial Intelligence and Robotics, Xi'an Jiaotong University **Sep 2023 – Present**

Supervised by Prof. Pengju Ren and Prof. Tian Xia. Research focus: **Software Prefetching Optimization** and **Prefetcher Side-Channel Attacks**.

Many HPC workloads are severely limited by memory latency. Software prefetching techniques can reduce memory access latency by fetching data into the cache in advance. In this research, we identified a novel prefetching strategy and developed an LLVM pass to automatically insert prefetch instructions, improving cache locality.

Co-authored the following paper as the second student author: Gelin Fu, Tian Xia, **Mingzhuo Yin**, Prashant Nair, Mieszko Lis, Pengju Ren*, "Magellan: A High-Performance Loop-Guided Prefetcher for Indirect Memory Access", International Symposium on Computer Architecture (ISCA), 2025.

Internship Experience

Tensorchord Intern **Oct 2023 – Present**

- Early development of **pgvecto.rs**, a PostgreSQL extension providing **vector similarity search**. Implemented indexing for sparse vectors and binary vectors, and researched state-of-the-art vector indexing algorithms.
- Development of **VectorChord-bm25** and **pg_tokenizer.rs**, PostgreSQL extensions for **BM25 ranking** and **tokenizer** functionalities. Developing most features from scratch, including implementation of the Block-WAND algorithm.
- Relevant Skills: Databases, Rust, Vector Indexing, BM25 Ranking, SIMD

Apache OpenDAL PMC Member **Apr 2023 – Present**

- Apache OpenDAL is an Open Data Access Layer that enables seamless interaction with diverse storage services.
- Contributed to the implementation of SFTP and GCS functionalities, as well as the development of C++ and Haskell bindings. Became a PMC (Project Management Committee) member upon community recommendation.
- Relevant Skills: Rust, Object Storage, C++, Haskell

Projects & Coursework

The Second Persona: A platformer puzzle game developed using Unity2D.

Mini-LSM: A simple key-value storage engine based on LSM-Tree. Built upon a provided framework, it supports operations like insert, query, delete, and features like Manifest, WAL, and MVCC Transactions.

Bustub: CMU 15-445 Database Systems Lab (Relational Database). Implemented Buffer Pool Manager, B+Tree Index, Query Execution, and Concurrency Control modules based on the provided framework.

SysY Compiler: PKU Compiler Lab. SysY is a simple subset of C. This project implements a compiler from SysY to RISC-V assembly, including basic syntax analysis, semantic analysis, intermediate code generation, and register allocation.

xv6-labs: MIT 6.S081 Operating System Engineering Lab. Implemented features including Utilities, System calls, Page tables, Traps, Copy-on-Write, Multithreading, Network driver, Locks, File system, and mmap.

RCore OS: Operating System Lab. Implemented modules for page tables, processes, file systems, IPC, concurrency, and IO.

Minnow: Stanford CS144 Computer Networking Lab. A simple TCP/IP protocol stack supporting basic IP, ICMP, ARP, UDP, TCP protocols, implementing basic routing, forwarding, and connection management.

Skills

- **Language Proficiency**: Chinese (native), English (CET-4: 546, CET-6: 492)
- **Programming Languages** (in order of proficiency): Rust, C/C++, Python 3, Haskell, JavaScript, Java, C#, Coq