Yujie Zhou

https://epsilonzyj.github.io

Email: yujie.zhou005@gmail.com
Mobile: +86-159-5014-3719

Education

- **Huazhong University of Science and Technology** — Wuhan, China
  Bachelor of Engineering in Computer Science and Technology — *Sept. 2023 – Jun. 2027*
  *GPA: 4.68/5.00, Rank: **1**/30*
  Honors: Outstanding Undergraduates, China National Scholarship(Top 0.2% nationwide)

Experience

- **National University of Singapore** — Singapore
  A+ Evaluation, NUS SOC Summer Workshop — *July 2025 – Aug. 2025*
  - Collected, cleaned, and preprocessed a multi-class image dataset for scenarios including smoking, fighting, falling, and littering, and trained/fine-tuned models using the **YOLOv7 framework** to optimize detection accuracy and speed for specific scenarios.
  - Implemented multi-model object detection and the **SORT tracking algorithm** to ensure robust target tracking in complex scenes; developed a **sliding-window algorithm** for video streams to enable effective recognition of continuous behaviors.
  - Designed and implemented an **end-edge-cloud architecture**, where the robot transmitted data efficiently to the server via **MQTT** for inference, and fed results back to both the monitoring client and the robot.
  - Built the monitoring client using **Dear PyGui**, covering the full pipeline from video input and model inference to result visualization.

Projects

- **RISC-V Proxy Operating System Kernel** — *Jan. 2026 – Mar. 2026*
  - A **multi-core concurrency-safe** proxy operating system kernel developed for the **Spike** target simulator based on the **RISC-V architecture**.
  - Implemented **Sv39 virtual memory** and **copy-on-write (COW)**, reducing overhead while preserving semantic correctness through page table permission control, page-fault-triggered copying, and page reference counting.
  - Built process management and scheduling modules, including **fork, yield, wait,** and **round-robin time slicing**, and introduced synchronization mechanisms such as **semaphores** and **spinlocks**.
  - Designed a **VFS (Virtual File System)** abstraction layer supporting basic file operations (**open, read, write, close**) as well as files, directories, links, and relative paths.
  - Developed an interactive **Shell** on top of the kernel, supporting command history, environment variables, and basic built-in commands; designed a **kernel-assisted pipe mechanism** for inter-process communication and implemented **dynamic scheduling of background tasks on multiple cores**.

- **RMDB Relational Database Management System** — *May 2025 – Aug. 2025*
  - Implemented SQL lexical and syntax parsing based on **Flex/Bison**, constructed the AST, and completed semantic analysis including column binding, type checking, and conditional expression validation.
  - Built a rule-based query optimizer and a **Volcano-model** execution engine, supporting operators such as **predicate pushdown, projection pushdown, index selection, and join plan generation**.
  - Designed a **page-based storage architecture**, **buffer pool**, and **B+ tree composite indexes**, supporting equality queries, range scans, and leftmost-prefix matching.
  - Implemented transaction rollback and **MVCC-based** snapshot visibility control, and built a logging and recovery framework to support database crash recovery.

Programming Skills

- **Languages**: C/C++, Python, Golang, Java, Swift, SQL
- **Skills**: Docker, Gin Web, Graph Transformer, Pytorch, Git, CMake, Makefile, Neovim