Liang Wang

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Education

Huazhong University of Science and Technology — September 2021 – June 2024 (Expected)
MSc in Computer Architecture — Wuhan, China

Wuhan University — September 2017 – June 2021
B. Eng in Software Engineering, GPA: 3.83/4.0, Rank: 16/258 — Wuhan, China

Internship Experience

Ping An Technology (Shenzhen) Co., Ltd. — February 2022 – Present
Algorithm Engineer Intern — Shenzhen, China

- Constructed the **KubeEdge** cluster; developed custom Mapper to parse and format client-side messages to facilitate communication between various devices and the edge; interfaced the edge MQTT Broker to TDengine via Kuiper to enable local data persistence.
- Deployed **Sedna** on the KubeEdge cluster; created multiple **video object detection** applications with **incremental learning** utilizing Sedna edge-cloud collaborative inference and training frameworks to address the issue of data drift.
- Implemented the Unsupervised Hard Example Mining algorithm to automatically obtain examples during video object detection as part of the dataset for incremental learning.
- Developed vision AI applications using the **DeepStream SDK** and deployed using Docker, with each able to process 10–30 video streams in real time when deployed on NVIDIA Jetson boards.

Huawei Technologies Co., Ltd. — November 2020 – April 2021
Cloud Infrastructure Software Engineer Intern — Shenzhen, China

- Contributed actively in developing the distributed file system **SFS Turbo 2.0**; implemented the Posix lookup and read I/O interfaces.
- Achieved non-blocking Inode ID generation during concurrent file creation, with reference to the distributed ID generator Leaf.
- Improved the system throughput by 2-3x by utilizing memory pool and coroutine libraries and upgrading SPDK/DPDK.
- Generated unit test cases (gtest) and analyzed performance issues (vdbench, mdtest, FlameGraph) for the system.

PingCAP, Inc. — July 2019 – August 2019
PingCAP Talent Plan Training Program — Beijing, China

- Designed the index recommendation algorithm, inspired by DB2 Advisor; implemented **Index Advisor** for **TiDB** which supported TiDB client-side interaction.
- Proved the effectiveness of Index Advisor by conducting TPC-DS tests, and demonstrated a 20x performance boost for some SQL queries after creating the recommended index.

Projects

LanguorDB: LSM-tree Based storage engine from ground-up, inspired by LevelDB. Designed the coarse-grained compaction strategy to reduce write amplification; implemented parallel lookup mechanism and row cache to optimize read efficiency.
MayflyCache: Lightweight implementation of a distributed cache. Used consistent hashing to select nodes for load balancing; implemented HTTP-based communication and Protobuf serialization data transfer; added singleflight to prevent hotspot invalidation.
HBtree: Hybrid DRAM-NVM index, whose structure is learned index ALEX (SIGMOD '20) in DRAM and B+Tree in NVM. Designed hot/cold identification to classify ALEX leaf nodes and construct B+trees from cold nodes to transfer cold data to NVM.
House Price Analysis: Web application based on Vue.js, Flask, and MySQL. Developed the back-end and leveraged Scrapy framework to crawl house prices for dozens of cities; designed a database that satisfied the third normal form.

Skills

Programming Languages: Go, C/C++, Rust, Python
Tech Skills: Edge Computing, Database Systems, Key-Value Storage Systems, Distributed Systems

Miscellaneous

Finished **MIT 6.824** and **CSAPP** computer course labs
Submitted 20+ PRs to well-known open-source software (TiDB, Sedna, etc.)

Preprints

Shoggoth: Towards Efficient Edge-Cloud Collaborative Real-Time Video Inference via Adaptive Online Learning

- **Liang Wang***, Kai Lu*, Nan Zhang, Xiaoyang Qu, Jianzong Wang, Jiguang Wan, Guokuan Li, Jing Xiao
- Submitted to *DAC 2023*, under review

EdgeMA: Model Adaptation System for Real-Time Video Analytics on Edge Devices

- **Liang Wang**, Nan Zhang, Xiaoyang Qu, Jianzong Wang, Jiguang Wan, Guokuan Li, Jing Xiao
- Submitted to *ICASSP 2023*, under review