Zirui Wang

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Education

Boston University Boston, MA
Master of Science in Computer Science *Sept. 2022 – Present*

Hangzhou Dianzi University Hangzhou, China
Bachelor of Engineering in Computer Science and Technology *Sept. 2018 – Jun. 2022*

Research Projects

Stream Processing System with State Disaggregation Feb. 2023 – May 2023
Boston University *Boston, MA*

- Designed and implemented a streaming data processing system capable of automated task allocation, loading balancing, and state storage disaggregation.
- Implement operators that handle the computation of stream data, including **stateless** operators such as Filter, KeyBy, Map, Union, and **stateful** operators such as Reduce, Count, and Sliding Window.
- Developed Task Manager that achieves state storage management, data I/O, and distribution. Implemented Control Plane to achieve load balancing, state routing, and other functions.
- Wrote test scripts in Java to test the latency of the system using local storage as well as remote state storage. Used **Prometheus** for real-time status monitoring of system latency.

Video Highlight Detection Based on Deep Learning Method Sept. 2020 – Jul. 2021
Hangzhou Dianzi University *Hangzhou, China*

- Used a hierarchical temporal context coding structure and proposed a low-rank decomposition-based video and audio fusion method to improve the detecting accuracy and speed. Successfully **exceeding the SOTA level** and improving the mAP value from 0.584 to 0.629. Paper accepted by **ICCV2021** .

Image inpainting Based on Generative Adversarial Networks Sept. 2019 – Jun. 2020
Hangzhou Dianzi University *Hangzhou, China*

- Designing Coarse and refined networks, and using attention mechanisms as well as designing sub-networks capable of generating texture features to complement the inpainting details. Increasing PSNR value by **15%** compared to the traditional method.

Projects

Key-Value storage database engine Mar. 2023 – Jun. 2023

- Based on **Bistcask**, developed a log-structure based KV storage database engine.
- Implemented basic CURD operations and support transactions.
- Optimized memory index (support ART, B+ Tree, B Tree), optimized file IO using MMap to speed up file reading, provided database state query to speed merge process.
- Complete support for HTTP, Redis data structures and the Redis protocol.

Sharded Key-Value storage system with fault-tolerant May 2022 – Sept. 2022

- Based on the **Raft** algorithm, implemented leader election and log replication mechanisms.
- Developed **fault tolerance** mechanisms, including log compaction and snapshotting.
- Designed and implemented **sharding** mechanisms for distributing data across multiple servers.

Alibaba Tianchi Global Video Cloud Innovation Challenge Mar. 2021 – Jul. 2021

- According to the competition problem, the Fast Instance Segmentation + Mask Refinement method is proposed to solve the problems of motion blur, frequent scene switching, and character edge refinement, making it possible to perform segmentation quickly and accurately.
- The competition ended up with a bronze prize (ranking 5/2904).

Publication

• Qinghao Ye, Xiyue Shen, Yuan Gao, **Zirui Wang**, Qi Bi, Ping Li, Guang Yang,"Temporal Cue Guided Video Highlight Detection with Low-Rank Audio-Visual Fusion", International Conference on Computer Vision (ICCV 2021)

Technical Skills

Language: Java, Go, Python

Framework: PyTorch, Flink, Spring Boot

Tools&Platforms: Git, Docker, Redis, Postman, Github, GitLab, Linux, SQL