Zhang Rui

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Educational Background

Huazhong University of Science and Technology 09/2019-07/2023
Major: Computer Science and Technology
GPA: 3.96/4.0; 90.9/100

Internship Experience

BOSCH Group (Shanghai) 07/2022-Present
Position: Intern, CR/RIX-AP (Central Research/Research of Intelligent ComputerX-Asian Pacific)

- Automated driving Intelligent-Connected-Vehicle V2X reliable edge computing system development
- Assisted mentor to complete RDS (Reliable Distributed System) related research and development work
- Currently working on GPU virtualization and K8s heterogenous cluster setup, including kubernetes, docker and other related deployment work, as well as CV pipeline decomposition, research task offloading in the field of autonomous driving applications

Research Experience

Clustering and Grid Computing Lab-Homogeneous Graph Representation Learning (HUST) 2020-2021

- Researched on homogeneous graph representation learning, focused on the design of embedding methods, improved graph neural networks (GNN, GCN, cluster-GCN, etc.), and achieved efficient embedding of large graphs

Clustering and Grid Computing Lab-Heterogeneous Graph Representation Learning (HUST) 2021-2022

- Researched the embedding of heterogeneous large graphs, improved the embedding methods of heterogeneous graphs (random walk, HGCN, etc.), and achieved efficient embedding of heterogeneous large graphs

Bosch CR/RIX-AP (Central Research/Research of Intelligent Computer X-Asian Pacific)-task offloading in intelligent connected vehicles 2022

- Researched on how to use task offloading in autonomous driving scenarios to help the vehicle side to complete tasks better with real-time and reliability with dependency and safety between tasks, and helped mentor to write Invention Report

Summer Workshop: Cloud Computing with Bid Data (National University of Singapore) 2021

- Understood the cloud computing in one week and did a project in two weeks
- Developed a music playback web by AWS cloud; deployed back-end tasks by FaaS to implement recommendation function

Project Experience

Heterogenous Kubernetes Cluster Setup (ongoing) (github)

- Setup heterogenous K8s cluster with Nvidia Jetson and NUC.
- Implement multus to support ROS2 application.
- Decompose CV pipeline and wrap them as microservices to realize distributed inferencing in the K8s cluster.
- Deploy monitoring stack including Prometheus and Grafana to monitor the performance of the cluster.
- Use python to evaluate the performance of the application including network latency and throughput.

GPU Virtualization for ARM (ongoing) (github)

- Modify Tencent GPU manager(CUDA API hijack) to adapt the ARM architecture.
- Setup Nvidia Jetson to test the functionality.
- Implement it in the Kubernetes cluster and schedule the GPU resources.

RISCV Virtual Machine Development (ongoing) (github)

- Develop debug tools (simplified GDB) to help debug the application.
- Realize basic RISCV instruction set and related RTL instruction.
- Realize OS, file system, batch system and multi-tasking. (ongoing)

CPU Design and Development Based on Logisim (github)

- Realize MIPS 24 command
- Realize ideal pipeline, bubble pipeline, redirect pipeline
- Realize multilevel/nested interrupts and pipeline interrupts
- Realize branch prediction
- Realize an album app

Ceph Cluster Setup

- Main work: Use docker to simulate the deployment of a ceph cluster on a single machine, use s3bench to test the performance of the cluster, and explore the tail delay phenomenon.
- Performance detection: uses s3bench+python scripts to batch detect the effects of parallelism and object size on latency and throughput.
- Exploration of the tail delay phenomenon: use s3bench to observe the tail delay phenomenon, and use the Golang to simulate the hedging request to reduce the tail delay phenomenon.

Cuckoo Hashing Optimization (github)

- Reduce the probability of it falling into an infinite loop by using larger slot
- Check the optimization effect by evaluating the load factor and the operation time

Honors

Third Prize of C/C++ Programming University Group A of the 13th Blue Bridge Cup National Software and Information Technology Professionals Competition, Hubei Campus 2022
Outstanding Individuals in the Summer Culture, Science, Technology and Health “Three Villages” Practice Activities of HUST University Volunteers 2021
Scholarship for Community Engagement in Huazhong University of Science and Technology 2020-2021
Scholarship for Academic Excellence in Huazhong University of Science and Technology 2019-2020
Scholarship for Community Engagement in Huazhong University of Science and Technology 2019-2020
Scholarship for Extracurricular Activities and Sports in Huazhong University of Science and Technology 2019-2020
Scholarship for Self-improvement in Huazhong University of Science and Technology 2019-2020
Second Prize of HUST Final of “FLTRP Cup” English Public Speaking Contest 2020
Outstanding Performance of the 13th HUST Model United Nations Conference

Others

Hobbies: Piano, Saxophone, Singing, Basketball, Tennis
TOEFL: 105 (Reading 29; Listening 29; Speaking 21; Writing 26)