Lianke Qin

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Education

Shanghai Jiao Tong University, Shanghai, China 2015.9 – 2019.7(expected)

Bachelor of Engineering in Software Engineering

Hong Kong University of Science and Technology, Hong Kong, China 2017.9 – 2017.12

Exchange in Computer Science and Engineering

Publication

- **Lianke Qin**, Yifan Gong, Tianqi Tang, Yutian Wang, Jiangming Jin. Training Deep Nets with Progressive Batch Normalization on Multi-GPUs, International Conference on Network and Parallel Computing, 2018

Experience

Alibaba Group OceanBase Team(distributed database system) 2019.2-2019.8(expected)

Research Intern

- Will be working on optimization of distributed key-value store to reduce its OLAP and OLTP mixed workloads response time by amending "SQL-over-NoSQL" achitecture.

Tsinghua University Future Lab, Affective Computing Group 2018.8-2018.9

Research Assistant Supervisor : Prof. Yingqing Xu

- Focus on reducing emotional loss during Voice-to-Text process. Design an algorithm to analyze sentiment of the voice record and autonomously add corresponding Emojis into text to express more accurate emotion(Valence / Arousal). Also conduct a user experiment to test its improvement over pure text.

TuSimple(An Autonomous Truck Startup in China and USA) HPC Group 2017.12 – 2018.8

Research Intern Mentor: Jiangming Jin

- Optimize Batch Normalization Operator in MXNet back end to improve Multi-GPU deep neural network training under small mini batch size by synchronizing key data among GPUs. Semantic Segmentation with DeepLab model on Visual Object Class Challenge 2012 dataset validation IoU score can improve up to 18.4%. Main features have been merged into MXNet master branch with the help from AWS AI team Dr. Hang Zhang. You can use SyncBatchNormalization operator in MXNet now.
- Learning from Kubeflow which combines Tensorflow and Kubenetes, try to deploy DL training workflow based on MXNet framework on Kubernetes which eliminates many of the manual processes involved in deploying and scaling containerized applications.
- Write automated test script to help Hardware Group do GPU/CPU stress test, memory bandwidth test, disk I/O test and so on. And save all the results into Excel file.

Projects

Distributed key-value store simulation in Go 2018.12 – 2019.1

- Phase1 : Implement simple MapReduce mechanism in Go.
- Phase2 : Implement Raft, a replicated state machine protocol, to achieve fault tolerance and replica consistency.
- Phase3 : Build a fault-tolerant key-value storage service using Raft library with snapshots features to achieve log compaction. This service supports Put(key, value), Append(key, arg) and Get(key).
- Phase4(ongoing) : Keep the keys over a set of replica groups. This sharding technique can improve total throughput performance by processing queries in parallel and balancing workloads among shards.

JOS 2018.12 – 2019.1

- Phase1 : Implement a physical memory and virtual memory manager to help kernel allocate/free memory and map virtual address to physical memory.
- Phase2 : Implement basic kernel facilities to get a protected user-mode environment process running and handle system calls and exceptions.
- Phase3 : Implement preemptive multitasking mechanism among multiple simultaneously active user-mode environments
- Phase4 : Implement a simple disk-based file system

A compiler for Tiger language 2018.12 – 2019.2

- Phase1 : Implement a lexical analyzer and parser for Tiger language.
- Phase2 : Add a module which type-checks an abstract syntax tree and produces any appropriate error messages about mismatching types or undeclared identifiers.
- Phase3 : Generate assembly files for each input prog.tig and link them with runtime.o to produce an executable file

A naive file system implementation based on YFS 2018.9 – 2018.12

- Phase1 : Implement basic file system API like GET, PUT, REMOVE, CREATE, LOOKUP, MKDIR, LINK and UNLINK at inode level utilizing block API provided by YFS.
- Phase2 : Implement a simple lock server for clients to require/release when operating this file system
- Phase3 : Add lock cache module in client side in order to reduce the workload on the lock server and improve client performance.
- Phase4 : Extend YFS file system to distributed one using HDFS interface to achieve fault tolerance and replicating data.

A DNA simulator based on HTC Vive 2018.5 – 2018.7

- Build your DNA based on the principle of complementary base pairing freely(with automated completion)
- Demonstrate how DNA helix is constructed ,its reverse process, and DNA transcription process.
- Use restriction endonuclease to cut DNA helix at specific location
- Persistently save DNA information and restore it when needed

Positive Time : An Android APP 2017.7–2017.8

This app aims to record app usage info so that it can provide data visualization and help users quit mobile phone addiction by Pomodoro Technique. Focus on back end server development including database design,recommendation system. Use K-means algorithm to divide users into several groups according to their app usage pattern. Then push new apps users may love using user-based collaborative filtering.

A naive key-value store based on B+ tree 2017.6–2017.7

This naive key-value store supports basic CRUD. The index of database is constructed into a B+ tree to speed up CRUD. Get the location and length of value corresponding to key and read it from data file. Garbage collection is implemented to reduce disk fragmentation due to frequent updating. Besides, a cache module is included to speedup CRUD using LRU replacement policy(implemented with a double circular linkedlist and a hashmap).

A simple path-tracking car 2016.2–2016.6

Computer analyses picture(black path in white background) taken by a fixed camera using OpenCV and extracts the path from it. Control the car go ahead, back or change direction using Arduino while constantly monitoring its moving progress. But it is not adaptively tolerant to surrounding noise.

Activities and Awards

"Intel Cup" International Embedded Contest translator volunteer	2016.7
Shanghai Jiao Tong University Merit Student	2016.9
"Building Bridges" Sino-US College Students Jointly Teaching	2017.8
Shanghai Jiao Tong University Academic Progress Award	2017.9