Lequn Chen

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Education

University of Washington   **Seattle**
Ph.D. Student, Computer Science   *Sept 2018–Present*
Advisor: Prof. Arvind Krishnamurthy

ACM Honors Class, Shanghai Jiao Tong University   **Shanghai**
Bachelor, Computer Science   *Sept 2014–June 2018*
Advisors: Prof. Weinan Zhang, Prof. Gui-Rong Xue, and Prof. Yong Yu

Research Interests

○ Distributed Systems   ○ Operating Systems

Publications

1. **ADARES: Adaptive Resource Management for Virtual Machines**
   - Ignacio Cano, **Lequn Chen**, Pedro Fonseca, Tianqi Chen, Chern Cheah, Karan Gupta, Ramesh Chandra, Arvind Krishnamurthy
   - arXiv, abs/1812.01837, 2018

2. **Enabling Strong Database Integrity using Trusted Execution Environments**
   - Kai Mast, **Lequn Chen**, Emin Gün Sirer
   - arXiv, abs/1801.01618, 2018

3. **Scaling Databases through Trusted Hardware Proxies**
   - Kai Mast, **Lequn Chen**, Emin Gün Sirer
   - Proceedings of the 2nd Workshop on System Software for Trusted Execution (SysTEX'17)

Current Research Projects

Nexus: A GPU Cluster for Accelerating Deep Neural Networks   *Jan 2019–Present*
- Cluster-scale GPU computation resource management.
- Co-scheduling groups of DNN invocations.
- Executing DNN fragments instead of the whole DNN.

AdaCon: Adaptive Resource Management for Containers   *Sept 2018–Present*
- Autoscaler on Kubernetes.
- Collecting both system-level and application-specific metrics.
- Predicting future work load and scaling intelligently using machine learning methods, including linear regressions and contextual bandits.

Course Works

CSE505 Principles of Programming Languages: Grade 4.0/4.0   *Autumn 2018*
CSE550 Introduction to Computer Systems Research: Grade 4.0/4.0   *Autumn 2018*

Research Experiences

Systems Lab
Cornell University

Visiting Research Intern, advised by Prof. Emin Gün Sirer and Kai Mast
July 2017–Dec 2017

- Worked on a database that provides blockchain-like guarantees of data integrity using *Trusted Execution Environments*.
  - Implemented large parts of the prototype on Intel SGX.
  - Boosted the performance inside the SGX enclave.
  - Increased the throughput of multi-client read workload 30x and reduced the latency by 40%.
  - Implemented transaction support with optimistic concurrency control.
  - Optimized query optimizer and executor, reducing cost of join operation to almost constant in typical workloads.
  - Found and solved dozens of deadlocks and data races in the initial version of the code.
  - Designed benchmarks and conducted experiments on a distributed testbed.

APEX Data & Knowledge Management Lab
Shanghai Jiao Tong University

Undergraduate Researcher, advised by Prof. Weinan Zhang
Mar 2017–June 2017

- Worked on Computational Advertisement. Built a machine learning pipeline for an advertisement exchange startup.
  - Designed and trained a *Click-Through Rate* (CTR) estimation model.
  - Integrate the model with the startup's *Real-Time Bidding* (RTB) software stack.

Tianrang Network Technology Co.,Ltd
Shanghai

Research Intern, advised by Prof. Gui-Rong Xue
June 2016–Mar 2017

- Worked on a program Yi playing board game Go similar to Google DeepMind's *AlphaGo*. Yi runs Monte-Carlo tree search algorithm, deep neural network, and reinforcement learning algorithms.
  - Designed and Implemented a distributed system running both CPU and GPU workers on multiple machines.
  - Reduced the network latency and increased single-machine performance.
  - Refactored the code base. Trained and tuned neural networks. It could beat entry-level professional human players.

Teaching Experiences

Compilers
Spring 2017

Student Instructor
🔗https://acm.sjtu.edu.cn/compiler2017

- Led the teaching assistant team.
- Redesigned assignments. Changed the target platform from *SPIM MIPS Simulator* to *Linux x86-64*, giving students more possibilities to do compilation optimization.
- Built a *Continuous Integration* (CI) system ⌂abcdabcd987/acm-compiler-judge. Once students pushed changes to their git repository, the CI would fetch the source code, compile it, test its performance on all test cases, and update the leaderboard.

Principle and Practice of Computer Algorithms
Summer 2016

Student Instructor
🔗https://acm.sjtu.edu.cn/wiki/PPCA_2016

- Built an online judge system for algorithm exams.
- Led a group of students to implement simplified MapReduce and Google File System. Deployed and benchmarked them on all machines of the computer room.

C++ Programming: Teaching Assistant
Fall 2015

Highlighted Projects

Compiler 2016 ⌂abcdabcd987/compiler2016
May 2016

- Compiles C-and-Java-like language to MIPS assembly. I paid close attention to code generation and optimization. Features included graph coloring register allocation, transformation in *Static Single Assignment* form, and different kinds of optimizations.

Programming Skill Set

I am experienced with C++, Python, Rust, Golang, JavaScript, SQL, systems programming, asynchronous networking programming, concurrent computation (multi-threading / distributed systems), and solving difficult bugs.