Xiangfeng Zhu

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Research Interests Cloud Computing, Distributed Systems, Systems for ML/Big Data, Federated Computation, Edge Computing

Education

University of Michigan, Ann Arbor Expected: May 2021

B.S., Computer Science(with honors)

Thesis: Toward Real-time Systems for Vision and Language Applications

Research Experience

Research Assistant Dec. 2018 - Now
Symbiotic Lab, University of Michigan
Advisor: Prof. Mosharaf Chowdhury

Fast Distributed Computation Over Slow Networks

- Co-Developed a general-purpose execution engine, Sol, that can adapt to diverse network conditions on top of Apache Spark.
- Improved SQL, machine learning, and streaming jobs by 4.2× and 16.4× on average, respectively, in offline and online settings compared to the state-of-the-art systems in resource-constrained networks.

Participant Selection for Federated Learning

- Co-Developed a participant framework to tackle data and device heterogeneity in Federated Learning using importance sampling
- Improved time-to-accuracy performance by 1.2× - 14.1× and final model accuracy by 1.3%-9.8% compared to state-of-the-art FL framework

System for complex vision and language applications

- Collaborating with Prof. Junchen Jiang at University of Chicago
- Designing a system for real-time, complex computer vision and natural language processing applications for visually impaired users

Undergraduate Researcher Mar. 2018 - Sep. 2019
Disorderly Lab, UC Santa Cruz
Advisor: Prof. Peter Alvaro

Protocol Repair Using Lineage Graphs

- Co-Designed a debugging approach for distributed systems based on analysis of data provenance obtained during system executions
- Co-Developed a standalone prototype Debugger Nemo and Evaluated it on the TaxDC collection of real-world bugs from large-scale distributed systems (e.g., Hadoop and HBase)

Undergraduate Researcher Mar. 2017 - Aug. 2017
Storage System Research Center, UC Santa Cruz
Worked under: Prof. Darrell D. E. Long and Prof. Ethan L. Miller

Rogue Cell tower(IMSI Catcher) detector

- Wrote a design document with three lab partners detailing the project and future work.
- Co-Designed an algorithm to pinpoint the location of IMSI Catchers based on received signal strength (RSS) and signal spike

Publications

1. Fan Lai, **Xiangfeng Zhu**, Harsha Madhyastha, Mosharaf Chowdhury, "Oort: Informed Participant Selection for Scalable Federated Learning", arXiv:2010.06081, *Submitted to NSDI' 21*
2. Fan Lai, Jie You, **Xiangfeng Zhu**, Harsha Madhyastha, Mosharaf Chowdhury, "Sol: Fast Distributed Computation Over Slow Networks", *Proceedings of the 17th USENIX Symposium on Networked Systems Design and Implementation (NSDI 2020)* , Santa Clara, CA, 2020 (Acceptance Rate: 18.36%)
3. Lennart Oldenburg, **Xiangfeng Zhu**, Kamala Ramasubramanian, Peter Alvaro, "Fixed It For You: Protocol Repair Using Lineage Graphs", *Proceedings of the 9th biennial Conference on Innovative Data Systems Research (CIDR 19)*, Asilomar, CA, 2019

Work Experience

Databricks May 2020 - Aug. 2020
Software Engineer Intern , Serverless Team

- Developed an efficient recycling mechanism for Spark clusters
- Designed and implemented a framework for zero downtime Spark cluster upgrade based on rolling updates and cluster pools

Dropbox May 2019 - Aug. 2019
Software Engineer Intern , Filesystem Team

- Worked on the next-generation distributed filesystem for Dropbox
- Designed and implemented an asynchronous system to unmount namespaces that a user loses access to
- Redesigned our Mapreduce framework to be more efficient and fault-tolerant using RocksDB and gRPC

Professional Activities

- **EuroSys 2021**, Artifact Evaluation Committee

Other Experience

- **CMPE107: Probability and Statistics** , UC Santa Cruz , Grader Spring 2018
- **CMPS12B: Introduction to Data Structures**, UC Santa Cruz , Learning Assistant Spring 2018, Winter 2018
- **CMPS101: Algorithms and Abstract Data Types**, UC Santa Cruz , Learning Assistant Fall 2017, Winter 2018

Awards

- **OSDI Conference Student Grant**, 2020
- **Dean's Honor List:** Fall 2016, Winter 2017, Spring 2017, Winter 2018, Spring 2018

Skills

- **Programming**: Java, C, C++, Python, Scala, Bash, SQL, HTML, CSS, LaTeX
- **Tools**: Perf, GDB, Valgrind, Make, Git, Vim, Docker

Miscellaneous

- **Personal Blog**: xzhu0027.gitbook.io/blog/