Xiangfeng Zhu

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Research Interests Networking, Cloud Computing, Distributed Systems, Operating Systems, Systems for ML, Federated Learning

Education

University of Michigan, Ann Arbor Expected: Dec 2020

B.S., Computer Science

- GPA: 3.82/4.00

Univeristy of California, Santa Cruz Sep. 2016 - June. 2018

B.S., Computer Science

- GPA: 3.94/4.00

Research Experience

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

Sol: 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 Apache Spark in resource-constrained networks.

Data Management for Federated Learning

- Developing a data/device management framework for client selection to tackle data/device heterogeneity in Federated Learning

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

Nemo: Protocol Repair Using Lineage Graphs

- Designed a debugging approach for distributed systems based on analysis of provenance data obtained during system executions
- Co-developed a standalone prototype Debugger Nemo and Evaluated our approach on the TaxDC collection of real-world bugs from large-scale distributed systems. Our experimental result shows that Nemo demonstrates the promise of automatic provenance-guided debugging for complex distributed protocols.

Box of Pain

- Designing a tracer and a fault injector using system-level provenance for unmodified distributed systems
- Evaluating our approach on real-world distributed systems(e.g. Redis and Apache Bookkeeper)

Undergraduate Researcher Aug. 2017 - Feb. 2018
Computer Communication Research Group, UC Santa Cruz
Advisor: Prof. J.J. Garcia-Luna-Aceves

CUP: Channel-Utilization Persistence for MAC protocols

- Helped Professor J.J. design the first transmission strategy(CUP) for contention-based MAC protocols which applies to any MAC protocols with carrier sensing, virtual carrier sensing, or priority acknowledgments.
- Analyzed the efficiency of Channel-Utilization Persistence MAC protocols, such as CUP-CSMA and CUP-CSMA/CA, using Markov Chains.
- Presented numerical results that compare the throughput of CUP-CSMA, non-persistent CSMA, and 1-persistent CSMA.

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. Our approach includes Neighboring Cell Tower Information, Absence of Encryption and Signal Strength.
- Designed an algorithm to pinpoint the location of IMSI Catchers based on received signal strength (RSS)
- Wrote C code to communicate with a SIMCOM module via AT commands and a GPS module

Work Experience

Incoming Software Engineer Intern, Databricks May 2020 - Aug. 2020

- Will be working in Databricks as a Software Engineer Intern

Software Engineer Intern, Dropbox May 2019 - Aug. 2019

- 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

Software Engineer Intern, Hainan Airline Jun. 2018 - Aug. 2018

- Worked on Airline Map team to create a new navigation app for pilots
- Implemented newly-designed pages and built interactive navigation with HTML, CSS, XML, and OpenLayers3

Projects

Distributed Debugger Using Provenance Graph 2018

- Implemented a lineage-driven distributed debugger that can analyze the given program and give suggestions to the programmer how and where to correct the program

Fault-tolerant Scalable Key-Value Store 2018

- Built a distributed, fault-tolerant, highly available and eventually consistent key-value store that can store the amount of data that cannot fit into one single machine.

Chess Puzzle Solver 2017

- Wrote a program that can determine if a player can force checkmate in up to 5 steps, including the moves of the opponent.

Online Reservation system 2017

- Designed an online reservation app for Manyue Yoga Stadium, on-line payment system, and on-line community for member to share their experience.

Publications

1. 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

2. 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

Other Experience

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

Awards

- **Dean's Honor List:** Fall 2016, Winter 2017, Spring 2017, Winter 2018, Spring 2018

Skills

- **Language**: English, Chinese
- **Programming**: Java, C, C++, Python, Go, Scala, Bash, SQL, HiveQL, HTML, CSS, LaTeX, JavaScript(Limited)
- **Platform**: Mac OS, Windows, Linux
- **Tools**: Perf, GDB, Valgrind, Make, Git, Vim, Neo4j, Docker
- **Data**: Oracle, MySQL, Hadoop, Hive, Spark, Flink, ZooKeeper

References

Dr. J.J. Garcia-Luna-Aceves University of California, Santa Cruz
Distinguished Professor of Computer Science and Engineering
Jack Baskin Endowed Chair of Computer Engineering
Phone: 831-459-4153 E-mail: jj@soe.ucsc.edu

Dr. Peter Alvaro University of California, Santa Cruz
Assistant Professor of Computer Science and Engineering
Phone: 415-813-9364 E-mail: palvaro@ucsc.edu

Chris Parsa University of California, Santa Cruz
Adjunct lecturer of of Computer Science and Engineering
Phone: 831-252-9033 E-mail: cparsa@ucsc.edu