

Jiaqi Shao

Federated Learning, Distributed System

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EDUCATION

- The Hong Kong University of Science and Technology** Sep 2023 -
PhD in Electronic and Computer Engineering
- The Chinese University of Hong Kong, Shenzhen** 2019 — 2023
Bachelor of Engineering in Electrical and Computer Engineer, *Stream: Computer Engineering*
GPA: 3.75/4.00 (top 10% in the school)

RESEARCH / INTERNSHIP EXPERIENCE

- FedCampus Platform** May 2023 – Sep 2023
¹ *Research Assistant in Division of Natural and Applied Sciences, Duke Kunshan University*
- Conducted private-preserving analysis on sensitive health data with differential privacy.
 - Developed a persistent and robust federated learning protocol for cost-efficient cross-device training using Python and TensorFlow Lite.
- Differential Private Federated Analytics** May 2022 — Fed 2023
² *Research Assistant in Shenzhen Institute of Artificial Intelligence and Robotics for Society (AIRS)*
- Developed a federated analytics protocol applying on cross-device settings with differential privacy protocol using Python, PyTorch.
 - Researched on differential privacy with histogram estimation and heterogeneous data using various algorithms and methods.
- FedEdge Platform – A Federated Learning Platform** December 2021 — May 2022
Research Assistant in Network Communication and Economics Laboratory (NCEL) Shenzhen, China
- Developed a cross-device federated learning platform for research experiments using *Python, Java, and C++*.
 - Managed heterogeneous devices by programming on Android mobiles with *Java*, IoT devices with *C++*, and the server with *Python*

HONORS / AWARDS

- Dean's List Award** (Awarded to top 20% at CUHKSZ) 2019 — 2020, 2021, 2022
- Academic Performance Scholarship** (Awarded to top 10 % at CUHKSZ) 2021 — 2022
- Undergraduate Research Awards** April 2022
— Awarded to undergraduate students dedicated to a self-proposed research program.
- Bowen Scholarship** (30,000 RMB per year) 2019 — 2020, 2021, 2022
- The 2nd Prize of ASC Student Supercomputer Challenge** March 2021
— Responsible for using C++ to implement distributed computation to achieve computational speedup.
- The 2nd Prize of “Yonyou·Huawei Cloud” 3rd Business Innovative Developer Competition** August, 2021
— Responsible for designing the application and leading the development progress to obtain business opportunities.

COURSE HIGHLIGHTS

- Distributed and Parallel Computation Course**
- Implemented distributed and parallel computing tasks, such as odd-even sort, NBody simulation, and heat simulation, by different parallelizing techniques like MPI, OpenMP, and CUDA.
 - Analyzed and optimized experiment results considering computation bottleneck and communication overhead.
- Operating System Course**
- Modified the loadable kernel module to execute system calls for user process execution using C.
 - Simulated virtual memory through implementing the invert page table to transfer virtual address with physical address, and least recent unused (LRU) algorithm to handle page fault/replacement using C++.
- Computer Architecture Course.**
- Implemented the MIPS simulator to simulate the execution of MIPS program, including encoding MIPS instructions into machine code, managing PC counter, and allocating memory space using C++.
 - Designed the pipelined CPU using Verilog, pipelining datapath with 5 stages, and handling data hazard and control hazard using Verilog.

COMPUTER SKILLS

Tools and Languages *Python, JavaScript, Git, C++*

¹Patent: B. Luo, J. Shao, J. Huang, Method and Apparatus for Frequent Items Mining Using Federated Analytics, CN202310365167.7, Mar. 2023, field

²Patent: B. Luo, J. Shao, J. Huang, Method and Apparatus for Frequent Data Mining Based on Hierarchical Federated Analytics, CN202310330791.3, Mar. 2023, field