XIAOSU, LYU

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EDUCATION

The George Washington University Washington, D.C., U.S.
Ph.D. Computer Science (Computer Architecture Networks and Distributed Computing, GPA:3.87/4.0) May 2024

The George Washington University Washington, D.C., U.S.
M.S. Computer Science (Distributed System and Machine Learning, GPA:3.86/4.0) May 2019

North China University of Technology Beijing, China
M.E. Computer Applications Technology (Database and Networking, Overall GPA:81/100) July 2009

Shenyang Jianzhu University Shenyang, China
B.E. Computer Science and Technology (Overall GPA: 86/100 Rank: 6th/175**)** July 2006

RESEARCH PROJECT

The George Washington University Washington, D.C., U.S.
*Research Assistant**,** Cloud Systems Lab* May 2019 to present

- Explore the trade-offs between isolation, high performance, and resource efficiency for a Runtime and how to provide autonomous system support to maximize them. (OpenWhisk, Sledge, Knative)

The George Washington University Washington, D.C., U.S.
*Research Assistant**,** Cloud Systems Lab* October 2018 to May 2019

- Researched the architecture and performance of OpenNetVM - a high-performance Network Function Virtualization (NFV) platform constructed using DPDK and mTCP

Independent study, Lab for Intelligent Networking and Computing October 2017 to September 2018

- By predicting the task execution time with deep learning to optimize Hadoop's task scheduling to minimize the total cost. (Tensorflow)

Course project, Machine Learning Course October 2018 to December 2018

- Created a deep learning model to predict currency exchange rates based on LSTM. (Keras)

North China University of Technology Beijing, China
Master defense project May 2008 to January 2009

- Designed a middleware to hide the heterogeneity of databases, and provided a uniform database query platform, which includes parsing and distributing SQL, merging results, API exposure, and UI design.

Shenyang Jianzhu University Shenyang, China
Bachelor defense project December 2005 to June 2006

- For a given point Q, designed an algorithm to retrieve all the data points that have Q as one of their k nearest neighbors (RKNN).

WORK EXPERIENCE

ARM Austin, U.S.
Intern Researcher; Systems May 2023 to August 2023

- Designed and implemented a secure Function-as-a-Service (FaaS) platform with security enclaves to ensure safe function code execution. Improved efficiency by minimizing enclave start-up time through enclave sharing and isolating functions with a WebAssembly sandbox inside enclave. (C++)

ARM Austin, U.S.
Intern Researcher; Systems May 2022 to August 2022

- Researched WebAssembly sandboxing technique and ported it to Three-Chains - a high-performance framework that provides task migration and remote function calls based on RDMA, to achieve isolation and security goals. (C)

ARM San Jose, U.S.
Intern Researcher; Software Architecture May 2021 to August 2021

- Extended Sledge (a serverless platform) to support DAG functions and offered a set of "pluggable" schedulers (EDF, SRSF) to minimize deadline violations for DAG functions in Serverless Edge. (C)

Bukahudong Technologies Co., Ltd Beijing, China
Core Software Engineer, Streaming Server R&D July 2015 to February 2016

- Designed and developed a ring-like architecture of a live streaming server cluster to support publishing, playing, and recording a live stream. (C++)

ChinaCache Beijing, China

Senior Network Engineer, Video R&D June 2014 to July 2015

- Maintained a tree-like architecture of a live streaming server cluster to support publishing, playing, time-shifting, and recording a live stream. (C++)
- Created an FLV live streaming module for Nginx to let Nginx support live streaming with FLV. (C)

ChinaCache Sunnyvale, U.S.

Senior Network Engineer, North American R&D April 2013 to June 2014

- Optimized the congestion control algorithm of TCP/IP by pacing packets sending within one send window to reduce bursty. Combined with tuning some of TCP parameters, the data transmission speed was 20% faster than the standard Linux kernel under 3G network. (C)
- Designed a real-time bandwidth estimation module for each TCP connection in Squid based on packet loss to let the upper layer compress images to different sizes according to the estimated network quality, which speeds up the display of images on handle devices. (C++)
- Ported UDT - a reliable UDP transmission library, to Squid to speed up the data transmission between Squids on LAN or high-speed WAN. (C++)

Beijing QuanShi Co., Ltd Beijing, China

Senior Network Engineer, Base Platform R&D October 2011 to April 2013

- Maintained a data transmission server for a video teleconference system based on RTP. (C++)
- Designed and implemented a UDP congestion control algorithm for the data transmission server to dynamically adjust the sending rate based on the feedback of packet loss from the client side, which improved the performance of the teleconference system by 30%. (C++)
- Worked closely with the Quality Assessment and operation team to support server deployment, rapidly fix bugs, and incorporate suggestions for improvement.

Beijing FastWeb Technology Co., Ltd Beijing, China

R&D Engineer; Network Planning R&D March 2011 to September 2011

- Designed and implemented a monitoring system (including one server and multi-clients) to check the availability of each CDN node. The server distributes tasks to clients and receives results from clients. Clients perform the availability check and send results back to the server. (C++)

Tianjin National Cybernet Security, Ltd Beijing, China

R&D Engineer, Information Security R&D February 2009 to March 2011

- Engaged in network programming. (C++)
- Implemented multiple types of proxy servers based on different proxy protocols, such as HTTP, HTTPS, SOCK4, and SOCK5. (C++)

Watchdata Technologies, Ltd Beijing, China

Intern, Security technology R&D May 2008 to January 2009

- Researched data security technologies such as Data Encryption and Decryption, Identity Authentication, Digital Signature, and PKI-related.
- Encapsulated a group of APIs based on OpenSSL and provided technical training about OpenSSL to the team members. (C)

PUBLICATIONS

- X. Lyu, "Balancing Three Important Goals for Runtimes - Isolation, High Performance, and Resource Efficiency," 2022 IEEE International Conference on Autonomic Computing and Self-Organizing Systems Companion (ACSOS-C), 2022, pp. 60-62, doi: 10.1109/ACSOSC56246.2022.00031.
- Xiaosu Lyu, Ludmila Cherkasova, Robert Aitken, Gabriel Parmer, and Timothy Wood. 2022. Towards efficient processing of latency-sensitive serverless DAGs at the edge. In *Proceedings of the 5th International Workshop on Edge Systems, Analytics and Networking (EdgeSys '22).* Association for Computing Machinery, New York, NY, USA, 49–54. https://doi.org/10.1145/3517206.3526274
- Viyom Mittal, Shixiong Qi, Ratnadeep Bhattacharya, Xiaosu Lyu, Junfeng Li, Sameer G. Kulkarni, Dan Li, Jinho Hwang, K. K. Ramakrishnan, and Timothy Wood. 2021. Mu: An Efficient, Fair and Responsive Serverless Framework for Resource-Constrained Edge Clouds. In *Proceedings of the ACM Symposium on Cloud Computing (SoCC '21).* Association for Computing Machinery, New York, NY, USA, 168–181. https://doi.org/10.1145/3472883.3487014
- Xiaosu, Lyu, Gaojun, Liu. Research the application of Visual Database technology in telecom transmission network management, The Thirteenth National Conference on Youth Communication Proceedings, volume one, 60:259-262, Oct. 2008