Alireza Farshin

Networked System Researcher

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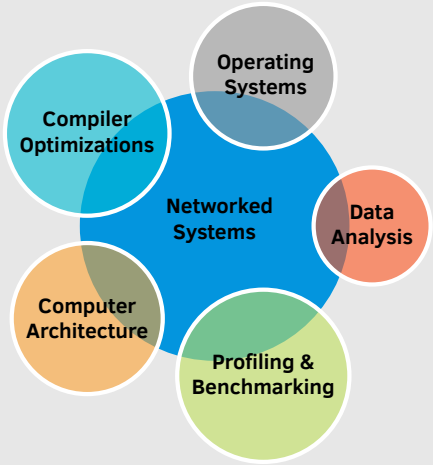
alireza-farshin

Google Scholar

aliireza

Technical Skills Overview



Programming & Tools

Linux • Shell Scripting • C • C++

DPDK • FastClick • Perf • LLVM

Git • Gnuplot • LaTeX

Python • MATLAB • R

TensorFlow • Spark • Pandas

Education

PhD., Information Communication Technology
Specialization: Communication Systems
School of EECS
KTH Royal Institute of Technology
2017 - 2023 | Stockholm, Sweden

MSc., Electrical Engineering
Specialization: Digital Electronic Circuits
Amirkabir University of Technology
2015 - 2017 | Tehran, Iran

BSc., Electrical Engineering
Specialization: Electronics
Sharif University of Technology
2010 - 2015 | Tehran, Iran

Research Summary

During my doctoral studies at KTH NSLab, I have improved the performance of the Network Functions Virtualization (NFV) service chains running at 100/200-Gbps commodity hardware by using **multi-disciplinary low-level optimization** techniques. I have been actively doing (networked) system programming in C/C++ and running automated experiments on the UNIX environment (e.g., Linux), using bash & Python scripts. My research has resulted in:

- Google PhD fellowship 2021 award in systems and networking, which recognizes outstanding graduate students doing exceptional and innovative research in areas relevant to computer science.
- Top systems conference papers (EuroSys'19, ATC'20, ASPLOS'21, and NSDI'22).
- 18 patent applications filed in collaboration with Ericsson research (see here).
- News articles at Ericsson Blog (about memory management, packet processing, and packet reordering), KTH news (about CPU cache and traffic order), Tech Xplore, and Framtidens Forskning.
- Community award at NSDI'22 for "Packet Order Matters".
- Open-source contributions (CacheDirector, DDIO-Bench, PacketMill, DDC-RA, and IOMMU-Bench).

Watch this video and read my full CV & dissertation for more information.

Experience

Aug 2017 - Present
Doctoral Student/Researcher — KTH NSlab
Stockholm, Sweden
Advisors: Professor Dejan Kostić & Professor Gerald Q. Maguire Jr.

- Proposed a slice-aware memory management technique to exploit the non-uniform cache architecture (NUCA) in Intel processors and implemented CacheDirector to send packets to the right slice of the Last-Level Cache (LLC).
- Implemented a set of benchmarks (DDIO-Bench) to study the effectiveness of Data Direct I/O Technology (DDIO) at 100 Gbps.
- Implemented PacketMill to grind the whole packet processing stack and produce a customized binary for a given network function.
- Analyzed a KTH campus trace (via Spark & Pandas) to extract flow-related characteristics & predict packet interarrival time with LSTM (via Keras/TensorFlow) to reorder packets using Reframer.
- Implemented a set of benchmarks (IOMMU-Bench) to study the impact of IOTLB misses on throughput and extended Page Pool API & mlx5 Linux driver to use 2-MiB hugepages for packet buffers to mitigate the IOTLB wall.
- Designed & Implemented a constraint-based C++ framework (DDC-RA) to allocate resources in a disaggregated data center.

Tools: DPDK, FastClick, Linux kernel, iPerf, Perf, LLVM, Intel PCM, Intel PMU Profiling Tools, Cache Allocation Technology (CAT), Spark, Pandas, Tensorflow, Gecode.
Hardware: Intel Xeon & AMD EPYC processors, NVIDIA/Mellanox & Intel NICs.

Dec 2015 - Jun 2016
Portal Specialist — Mobile Telecommunication Company of Iran (MCCI)
Tehran, Iran
Managed vendors and supervised the development of:

- eCare Application: MyMCI application for iOS and Android
- eSales Website eVoucher

Fall 2013
Co-founder and CEO — CafeYab
Tehran, Iran
Designed & implemented an application for iOS and Android for finding nearby coffee shops.