QIONGWEN XU

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https://qiongwenxu.github.io

I am a third-year Ph.D. student at Rutgers University advised by Prof. Srinivas Narayana. I am broadly interested in fast computer networking.

EDUCATION

Rutgers University, Ph.D. Student in Computer Science *Sept. 2019 - Present*
Advised by Prof. Srinivas Narayana
GPA: 3.786/4

Fudan University, M.Sc. in Computer Science *Sept. 2015 - June 2018*
Advised by Prof. Xin Wang, Prof. Jin Zhao
GPA: 3.37/4
Thesis: A Fast Shortest-Path Query Algorithm on Large-Scale Graphs Using Tree Decomposition

Central China Normal University, B.Eng. in Electronic Engineering *Sept. 2011 - June 2015*
GPA: 90.66/100

Georg-August-University of Göttingen, Visiting scholar *Aug. 2016 - Oct 2016*
Hosted by Prof. Xiaoming Fu

WORK EXPERIENCE

Software Engineer, Huawei Technology Co. Ltd *July 2018 - July 2019*
Software Engineer Intern, DELL EMC *Dec. 2016 - May 2017*

PUBLICATIONS

1. Qiongwen Xu, Michael Dean Wong, Tanvi Wagle, Srinivas Narayana, Anirudh Sivaraman, "Synthesizing safe and efficient kernel extensions for packet processing," in *ACM SIGCOMM*, 2021.
2. Kun Qiu, Siyuan Huang, Qiongwen Xu, Jin Zhao, Xin Wang, Stefano Secci, "Paracon: a parallel control plane for scaling-up path computation in SDN," in the *IEEE Transactions on Network and Service Management (TNSM)*, 2017.
3. Qiongwen Xu, Xu Zhang, Jin Zhao, Xin Wang and Tilman Wolf, "Fast Shortest-Path Queries on Large-Scale Graphs," in the *Proceedings of IEEE International Conference on Network Protocols (ICNP)*, 2016.

AWARDS

1. National Scholarship, Ministry of Education of China, 2014, 2016.
2. Second Class Scholarship, Fudan University, 2015.
3. Zhuyoujun Scholarship, Central China Normal University, 2014.
4. Model Student, Central China Normal University, 2014.
5. Second Prize, Undergraduate Electronics Design Contest (Hubei Province), 2014.
6. First Prize, National Undergraduate Computer Design Competition, 2014.

RESEARCH PROJECTS

Synthesizing safe and efficient kernel extensions for packet processing Sept. 2019 - Present
Rutgers University https://k2.cs.rutgers.edu

- The objective of this project is to develop an optimizing compiler that leverages program synthesis to automatically produce safe, compact and more performant BPF programs. The experimental result shows that the optimizing compiler K2 produces code with 6–26% reduced size, 1.36–55.03% lower average packet-processing latency, and 0–4.75% higher throughput (packets per second per core) on a number of realistic benchmarks. K2's domain-specific techniques accelerate equivalence-checking of BPF programs by 6 orders of magnitude.

Fast Shortest-Path Queries on Large and Sparse Graphs Sept. 2015 - July. 2016
Fudan University

- A tree-decomposition-based algorithm is proposed for reducing the runtime of constructing the distance oracle and answering a large number of shortest-path queries for a weighted undirected graph. We prove that the time complexity of building the distance oracle is $O(nw^2 \log w)$ where n is the number of the vertices and w is the treewidth. We also prove answering a shortest-path query takes at most $O(nw)$.

RESEARCH PRESENTATIONS

1. "Automatically optimizing BPF programs using program synthesis," at Linux Plumbers Conference (Networking and BPF Summit), 2021.
2. "Synthesizing safe and efficient kernel extensions for packet processing," at ACM SIGCOMM, 2021.
3. "Automatic optimization of endpoint packet-processing programs," at NPI retreat, 2020.
4. "Fast Shortest-Path Queries on Large-Scale Graphs," at ICNP, Singapore, 2016.

TECHNICAL SKILLS

Programming Languages	C/C++, Python, Golang
Software	MS Office, Latex
Platforms	Windows, Linux/UNIX, macOS

COURSEWORK

Computer Networks, Operating Systems Theory, Programming Languages And Compilers, Design And Analysis of Data Structures And Algorithms, Computer Security.