Qiao Zhang

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Education

University of Washington — Seattle, WA
Ph.D. in Computer Science and Engineering — July 2013 -
Advisors: Tom Anderson
GPA: 3.89/4.0

Williams College — Williamstown, MA
B.A. with *summa cum laude* in Computer Science and Physics — June 2013
GPA: 3.99/4.0

California Institute of Technology — Pasadena, CA
Visiting student — Oct 2011 - June 2012
GPA: 4.0/4.0

Graduate Coursework

Distributed Systems, Operating Systems, Machine Learning

Interests

Distributed Systems and Networking, Large-scale Machine Learning

Research

Overt ECMP for Reliability and Performance

Modern large-scale data center networks employ Clos topology with ECMP as the routing protocol. ECMP has a few well-known deficiencies: it does not handle the asymmetry introduced by failures in the network well; it makes fault localization difficult due to load balancing through hash functions. Our key observation is that ECMP hash functions are not random but deterministic and often can be reverse engineered by network operators. Knowledge of ECMP hash functions makes source routing in a large-scale data center network possible, enabling fine-grained fault localization as well as effective load balancing in the presence of failures. This work is in progress.

One Tunnel is (often) Enough

The Internet is vulnerable to outages, black holes, hijacking and denial of service. With collaborators at UW Networking lab, we design and implement an incrementally deployable yet complete solution that allows ISPs to sell reliability and security as a service to customers sending mission-critical traffic. I implemented a fault-tolerant ISP edge network in software on commodity PCs providing TaaS API to end-hosts, and deployed and evaluated the ISP performance on VICCI research cluster. Potential customers can establish circuits and route packets reliably in an end-to-end fashion through our ISP. This work is accepted at SIGCOMM 2014.

A Non-invasive Tongue Machine Interface

With collaborators at UW, I developed TongueSee, a non-intrusive tongue machine interface that can recognize a rich set of tongue gestures using electromyography signals from the surface of the skin and machine learning algorithms. I designed and tested a set of time-domain features and an anytime classification algorithm that can reliably classify six tongue gestures with an accuracy of 94.17% using data from eight EMG sensors. In addition, our preamble design achieves a low false positive probability of 0.000358 per second. This work is accepted at SIGCHI 2014.

Publications

Danyang Zhuo, **Qiao Zhang**[a], Dan Ports, Arvind Krishnamurthy and Tom Anderson *Machine Fault Tolerance for Reliable Datacenter Systems.* APSYS 2014.

Simon Peter, Umar Javed, **Qiao Zhang**, Doug Woos, Tom Anderson, and Arvind Krishnamurthy. *One Tunnel is Enough.* SIGCOMM 2014.

Qiao Zhang, Shyam Gollokota, Ben Taskar, Rajesh Rao. *A Non-invasive Tongue Machine Interface.* CHI 2014.

[a]first two authors equal in contribution

Honors and Awards

Wilma Bradley Endowed Fellowship 2013-2014

Phi Beta Kappa 2012

Contest in Mathematical Modeling Honorable Mention 2013

National Mathematics Olympiad (Singapore) Silver Medal 2008

National Physics Olympiad (Singapore) Bronze Medal 2007

Work Experience

Google Mountain View, CA
Software Engineering Intern on Platforms Networking Team Sept - Dec 2015

Google Mountain View, CA
Software Engineering Intern on MapReduce Team June - August 2014

UW Computer Science and Engineering Seattle, WA
Research Assistant July - Sept 2013

Williams College Physics Department Williamstown, MA
Research Assistant June - Aug 2012

Cogo Labs Cambridge, MA
Web Development Intern June - Aug 2011

Programming Skills

Fluent in **C/C++**, **Python**, **Java**
Familiar with **MySQL**