

Chen Qian

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Education

Ph.D., Computer Science, The University of Texas at Austin
08/2008 - 06/2013 (expected)

Advisor: Simon S. Lam, Member of National Academy of Engineering, Fellows of ACM and IEEE

Master of Philosophy, Computer Science and Engineering, The Hong Kong University of Science and Technology (HKUST)

08/2006 - 07/2008

Advisor: Lionel M. Ni, Fellow of IEEE

Bachelor of Science, Computer Science, Nanjing University, *Summa Cum Laude*

09/2002 - 06/2006

Advisors: Jiafu Xu & Fangmin Song

Research Interests

Computer networks and distributed systems, large-scale data center networks and Ethernets, wireless and mobile networks

Refereed Journal Publications

1. Chen Qian, Yunhuai Liu, Hoilun Ngan, and Lionel M. Ni, "ASAP: Scalable Arbitration for Contactless RFID Systems," accepted by *IEEE Transactions on Parallel and Distributed Systems (TPDS)*.
2. Chen Qian, Hoilun Ngan, Yunhao Liu, and Lionel M. Ni, "Cardinality Estimation for Large-scale RFID Systems," in *IEEE Transactions on Parallel and Distributed Systems (TPDS)*, September, 2011. (*Selected as the spotlight paper of the issue. 40+ citations along with the conference version*)

Refereed Conference/Workshop Publications

1. Song Han, Tianji Li, Chen Qian, Douglas Leith, Aloysius K. Mok, Simon S. Lam, "HartFi: An Energy-Efficient Localization System," in *Proceedings of ACM SIGCOMM Workshop on Energy and IT: from Green Networking to Smarter Systems*, Toronto, ON, Canada, 2011.
2. Chen Qian and Simon S. Lam, "Greedy Distance Vector Routing," in *Proceedings of The 31st International Conference on Distributed Computing Systems (IEEE ICDCS)*, Minneapolis, Minnesota, 2011. (Acceptance Ratio: 15%)
3. Yuanqing Zheng, Mo Li, and Chen Qian "PET: Probabilistic Estimating Tree for Large-Scale RFID Estimation," in *Proceedings of The 31st International Conference on Distributed Computing Systems (IEEE ICDCS)*, Minneapolis, Minnesota, 2011. (Acceptance Ratio: 15%)
4. Simon S. Lam and Chen Qian, "Geographic Routing in d -dimensional Spaces with Guaranteed Delivery and Low Stretch," in *Proceedings of International Conference on Measurement and Modeling of Computer Systems (ACM SIGMETRICS)*, San Jose, California, 2011. (Acceptance Ratio: 14.7%)
5. Chen Qian, Yunhuai Liu, Hoi-Lun Ngan, and Lionel M. Ni, "ASAP: Scalable Identification and Counting for Contactless RFID Systems," in *Proceedings of the 30th International Conference on Distributed Computing Systems (IEEE ICDCS)*, Genoa, Italy, 2010. (Acceptance Ratio: 14.3%)

6. Chen Qian, Simon S. Lam, and Vinod Venkataraman, "A Wireless Routing Protocol in d -dimensional Spaces," in *Proceedings of the 7th ACM Conference on Embedded Networked Sensor Systems (ACM SenSys)*, Poster Session, Berkeley, California, 2009.
7. Xi Zhou, Guangtao Xue, Chen Qian, and Minglu Li, "Efficient Data Suppression for Wireless Sensor Networks," in *Proceedings of the Fifteenth International Conference on Parallel and Distributed Systems*, Melbourne, Australia, 2008.
8. Jian Ma, Chen Qian, Qian Zhang, and Lionel M. Ni, "Opportunistic Transmission Based QoS Topology Control in Wireless Sensor Networks," in *Proceedings of the Fifth IEEE International Conference on Mobile Ad-hoc and Sensor Systems (IEEE MASS)*, Atlanta, Georgia, 2008. (Acceptance Ratio: 24%)
9. Chen Qian, Hoi-Lun Ngan, and Yunhao Liu, "Cardinality Estimation for Large-scale RFID Systems," in *Proceedings of the Sixth Annual IEEE International Conference on Pervasive Computing and Communication (IEEE PerCom)*, Hong Kong, 2008. (Acceptance Ratio: 11.9%)
10. Jian Ma, Qian Zhang, Chen Qian, and Lionel M. Ni, "Energy-efficient Opportunistic Topology Control in Wireless Sensor Networks," in *Proceedings of the First International Workshop on Mobile Opportunistic Networking (ACM/SIGMOBILE MobiOpp)* in conjunction with *ACM MobiSys*, Puerto Rico, June 11, 2007.
11. Yanmin Zhu, Yunhuai Liu, Hoilun Ngan, Quanbin Chen, Chen Qian, Jian Ma, and Dian Zhang, "Shift Coding: Efficient State Update in Mobile Peer-to-Peer Multiplayer Games," in *Proceedings of the 36th Annual International Conference on Parallel Processing (ICPP Workshops)*, Xi'an, China, 2007
12. Chen Qian, "Quantum Entanglement and Quantum Computing," *Journal of Computer Science*, Vol. 11, Nov. 2006. (in Chinese)

Non-refereed Publications

1. Chen Qian, "Efficient Cardinality Counting for Large-scale RFID Systems," Thesis of Master of Philosophy, Hong Kong University of Science and Technology, 2008.
2. Chen Qian, "Quantum Entanglement in Quantum Computing," in *Quantum Computing* (Jiafu Xu and Fangmin Song, eds.) Chapter 3, Nanjing University, 2007. (in Chinese)

Patent

Lionel M. Ni and Chen Qian, "An Efficient Counting Scheme for RFID Systems," filed for Chinese patent protection, Document Number: 200810029206.1.

Honors and Awards

2012 James C. Browne Graduate Fellowship, Sole Recipient of 2012,
 2010, 2011 ACM SIGCOMM Travel Award,
 2009, 2011 UTCS Travel Award,
 2006-2008 HKUST Postgraduate Studentship,
 2006 Excellent Graduate Award, Nanjing University,

Research Experience

Research Assistant

Department of Computer Science

01/2009–Present

University of Texas at Austin

Scalable multicast for data-center networks: recent advances of data-center networks requires to support group communication of large groups and large numbers of groups. Existing IP multicast schemes is not scalable, because either switches or message headers have to store large multicast state, i.e., the information of multicast trees. We propose to use recursive virtual-location routing to implement multicast functions, which only requires very small state in switches and message headers.

Routing Over Metropolitan-scale Ethernet (ROME): Current Ethernet techniques does not fit Metropolitan-scale layer-2 networks, because both the spanning-tree routing and the address resolution scheme suffer from scalability problem. We propose ROME, which uses GDV as the routing protocol and location-hashing as the address resolution scheme, providing scalability for very large Ethernets. ROME also includes a state-less multicast protocol that provides scalable VLAN service.

Greedy Distance Vector Routing (GDV): GDV is the first geographic routing protocol designed to optimize end-to-end path costs using any additive routing metric that distance vector routing can use. GDV requires no node location information. Instead, GDV uses estimated routing costs to destinations which are locally computed from node positions in a virtual space. GDV makes use of VPoD, a new virtual positioning protocol for wireless networks. Experimental results show that the routing performance of GDV is better than prior geographic routing protocols when hop count is used as metric and much better when ETX is used as metric. As a geographic protocol, the storage cost of GDV per node remains low as network size increases.

Geographic routing protocol in d-dimensional spaces: Designed a novel geographic routing protocol, MDT, for 2D, 3D, and higher dimensions with these properties: (i) guaranteed delivery for any connected graph of nodes and physical links, and (ii) low routing stretch from efficient forwarding of packets out of local minima. The guaranteed delivery property holds for node locations specified by accurate, inaccurate, or arbitrary coordinates. MDT is resilient to network dynamics and scalable in storage, communication cost, and computation cost.

Accurate link prediction algorithm for online social networks (OSNs): Proposed two algorithms that mine the evolution of OSNs to improve link prediction. They are more accurate than commonly-used methods based on our experiments.

Visiting Researcher

973 Wireless Sensor Networks Joint Laboratory

Research Topics: Selective data transmission and load-balancing in wireless sensor networks; RFID systems.

05/2008 - 07/2008

Shanghai Jiaotong University

Research Assistant

Department of Computer Science and Engineering

Scalable collision-arbitration protocol for RFID systems: When RFID tags are mobile and in large numbers, existing collision-arbitration protocols might not satisfy the scalability and time-efficiency requirements of many applications. To address this problem, an Adaptively Splitting-based Arbitration Protocol (ASAP) is proposed to provide low-latency RFID identification with stable performance for up to billions of tags.

Cardinality estimation for large-scale RFID systems: Designed a tag cardinality counting scheme, LoF, with three major advantages. First, LoF reduces the time cost from $O(N)$ to $O(\log N)$, where N is the tag number. Second, LoF increases the system operating range from $O(L)$ tags to 2^L tags, where L is the length of a ALOHA frame. Third, LoF supports RFID systems with multiple readers.

Visiting Researcher

973 Wireless Sensor Networks Joint Laboratory

Research Topics: Data aggregation in sensor networks; RFID systems; opportunistic routing and network coding.

05/2007 - 08/2007

Shanghai Jiaotong University

Research Assistant

State Key Lab for Novel Software Technology

Research Topics: Quantum computing, Quantum programming, Quantum compilers.

2005-2006

Nanjing University

Presentations

- “Greedy Distance Vector Routing,” in IEEE ICDCS conference, Minneapolis, Minnesota, 2011;
- “Geographic Routing for Practical Applications,” Huawei Research Lab, Santa Clara, California, 2011;
- “Geographic Routing in d -dimensional Spaces with Guaranteed Delivery and Low Stretch,” in ACM SIGMETRICS conference, San Jose, California, 2011;
- “Real-time RFID Cardinality Estimation”,
- 973 WSN Joint Lab, Shanghai, Jun. 2008;
 - Institutes of Advanced Technology, Chinese Academy of Sciences, Apr. 2008;
- “Cardinality Estimation for Large-scale RFID Systems”, in IEEE PerCom conference, HK, Mar. 2008;
- “Opportunistic Routing”, 973 WSN Joint Lab, Shanghai, Jul. 2007.

Teaching Experience

- Teaching Assistant, CS356 Computer Networks, UT Austin, Fall 2008,
- Teaching Assistant, COMP211&211H Introduction to Software Engineering (Honor’s Track), HKUST, Spring 2008,
- Teaching Assistant, COMP362 Advanced Computer Networks, HKUST, Fall 2007,
- Teaching Assistant, COMP211&211H Introduction to Software Engineering (Honor’s Track), HKUST, Spring 2007,
- Teaching Assistant, COMP104 Programming Fundamentals and Methodology, HKUST, Fall 2006,
- Teaching Assistant, Technical English, Nanjing University, Fall 2005,

Professional Activities

- Technical Program Committee Member:** HotPOST: The Fourth International Workshop on Hot Topics in Peer-to-Peer Computing and Online Social Networking
- Reviewer:** *IEEE Transactions on Parallel and Distributed Systems*; *IEEE Transaction on Mobile Computing*; *Elsevier Computer Communications*; *Ad Hoc and Sensor Wireless Networks: An International Journal*; *IEEE Transaction on Wireless Communication*; *Wireless Networks (Springer)*; *IEEE Transactions on Automation Science and Engineering*; *IEEE Infocom* 2009, 2012; *IEEE ICC* 2008, 2012; *IEEE GlobeCom* 2011;
- External Reviewer:** *ACM Transaction on Sensor Networks*; *IEEE Transaction on Wireless Communication*; *IEEE Infocom* 2008, 2009, 2011; *IEEE ICDCS* 2011; *ACM MobiHoc* 2008; *IEEE PerCom* 2008, 2009; *IEEE IWQoS* 2007; *IEEE RTSS* 2007 *ICDCN* 2008; *IEEE ICC* 2008; *IEEE MASS* 2008; *IEEE ICPADS* 2008; *ACM/SIGMOBILE MobiOpp* 2007; *IEEE Globecom* 2007;
- National Science Foundation of China (NSFC), 2008.

Membership

- IEEE and Communication Society student member. ACM student member

Reference

- Available upon request