YAO ZHAO

CONTACT

Northwestern University
EECS Department, Tech Inst. Room L359
2145 Sheridan Road
Evanston, Illinois 60208-3118

jingo@u.northwestern.edu
www.cs.northwestern.edu/∼yzhao/
Phone: (312) 363-7532

EDUCATION

Northwestern University, Evanston, IL
Ph.D student in EECS department, Sep. 2004 ∼ Feb 2009.
Advisor: Professor Yan Chen.
Research area: network measurement, network security and wireless networks

Tsinghua University, Beijing, China
Master of Engineering in Computer Science, Jan. 2004.
Thesis: *MAC Protocol and Multicast Routing Protocol Design in Mobile Ad Hoc Networks*.
Advisors: Professor Meilin Shi and Professor Yong Xiang.

Tsinghua University, Beijing, China
Bachelor of Science in Computer Science, Jul. 2001.

COMPUTER SKILLS

Proficiency in C and C++

Experienced in Java, C#, Perl, HTML, and Javascript

Well experienced in Matlab

Well experienced in Windows and Linux

EXPERIENCE

Microsoft Research, Silicon Valley   **Jan 2008 ∼ Feb 2008**
Internship

Spamming Botnet Detection – Construct the IP sharing graph between hotmail user accounts and extract the groups of the spamming accounts. Botnet activities then are studied from the grouped spamming accounts. Parallel algorithms are designed using the DryadLINQ computing cluster to deal with tera-bytes of data.

Microsoft Research, Silicon Valley   **Jun 2007 ∼ Aug 2007**
Internship

System Build-up – Implement UDMap (a system to automatically identify dynamic IP addresses) on DryadLINQ (a distributed computing system) so that UDMap can deal with huge data of tera bytes. The code has been transferred to Hotmail group.

Passport Abuse Detection – Spammers sign up many passports and then use hotmail to send spams. We study the abuse of Microsoft passport problem and propose abuse detection schemes.

Northwestern University, Evanston, IL   **Aug 2004 ∼ Present**
Ph.D. Student, Department of Computer Science

Network Monitoring and Diagnostics – Research includes approaches to 1) diagnosis large distributed systems (such as Hadoop) using semantics assisted gray-box approach. 2) monitor and diagnosis ISP VPN and IP backbone-extended networks under specific operation constraints (*e.g.*, upper-bound of link bandwidth for measurements), 3) diagnose link-level metrics with measurement infrastructure, 4) conduct on-demand online link-level diagnosis without infrastructure.

Routing and Data-Centric Storage in Sensor Networks – Research includes approaches to 1) design scalable and efficient data-centric storage algorithm for sensornets, 2) design practical and scalable compact routing for sensor networks with guaranteed routing path stretch.

Wireless Security – Research includes investigating potential security holes in Wifi and 802.16 (WiMAX) networks. Real-world attacks on Wifi networks with EAP-based authentication are implemented.

Oracle Cooperation, Beijing, China   Jan 2004 ∼ Jul 2004
Software Engineer, Beijing R&D Center

Stress Test on Oracle Collaboration Suite – Principal responsibilities include the development of a stress test toolkit to evaluate E-Mail, NNTP, and Ultrasearch components for the Oracle Collaboration Suite.

Microsoft Research Asia, Beijing, China   Aug 2003 ∼ Jan 2004
Student Intern, Wireless & Network Group

Virtual Coordinate based Routing in Wireless Network – Our research developed and investigated a new virtual coordinate based greedy routing protocol (Hop ID based routing) that does not require location information. Our new ad hoc routing protocol outperformed the geographic routing in sparse network, as the virtual coordinate reflects the topology of the network better than geographic location.

Tsinghua University, Beijing, China   Sep 2001 ∼ Jan 2004
Master Student, Department of Computer Science

Multi-channel MAC Protocol Research for Ad Hoc Network – Our research investigated multi-channel technique that improved the overall capacity and throughput of wireless ad hoc networks. Aiming at multicast in wireless network, We propose MCMAC protocol, which applies multi-channel technique for multicast data transmission in MAC layer, and thus improves the throughput. RMCMAC, which is extended from MCMAC, takes reliability into account.

Multicast Routing Support for Video Conference System in Mobile Ad Hoc Network – We proposed the On-Demand Multicast Routing Protocol with Multipoint Relay (ODMRP-MPR) which improves ODMRP. Based on ODMRP-MPR, our group constructed a mobile ad hoc network testbed for video conference system, and then built a prototype on the testbed.

Sohu Company, Beijing, China   Jul 2000 ∼ Dec 2000
Part time, Software Engineer, Java Game Group

Development of Online Java Game – Duties include implementation for several poker games while maintaining synchronization and robustness for networks with heavy loads.

PATENTS

Eliot C. Gillum, Qifa Ke, Yinglian Xie, Fang Yu and Yao Zhao, *Graph Based Bot-User Detection*, being filed through Microsoft Corporation, MS docket number 324953.01.

Jia Wang, Yan Chen, Dan Pei, Yao Zhao, and Zhaosheng Zhu, *Towards Efficient Large-Scale Network Monitoring and Diagnosis Under Operational Constraints*, being filed through AT&T, docket number 1209-144.

BOOKS

Yao Zhao and Yan Chen, *Algebraic Approaches for Scalable End-to-End Monitoring and Diagnosis*, invited book chapter for "Algorithms for Next Generation Network Architecture", Springer, 2009 (to appear)

Leiming Xu, Bo Pang and **Yao Zhao**, *NS and Network Simulation* (Chinese), POSTS & TELECOM PRESS, ISBN: 7-115-11867-1, 2003

JOURNAL ARTICLES

Y. Zhao, Y. Chen, and D. Bindel, "Towards Unbiased End-to-End Network Diagnosis," to appear in *IEEE/ACM Transactions on Networking*.

Y. Zhao and Y. Chen, "FAD and SPA: A Suite of Schemes for User-level Network Diagnosis without Infrastructure," to appear in *Computer Networks Journal*.

Y. Zhao, Y. Chen, B. Li and Q. Zhang, "Hop ID: A Virtual Coordinate based Routing for Sparse Mobile Ad Hoc Networks," in *IEEE Transaction on Mobile Computing*, Vol. 6, No. 9, pp. 1075-1089, September, 2007

CONFERENCE PUBLICATIONS

Y. Zhao, S. Vemuri, J. Chen, Y. Chen, H. Zhou and Z. Fu, "Exception Triggered Attack on Wireless Networks," to appear in DSN-DCCS, Jun. 2009

Y. Zhao, Y. Xie, F. Yu, Q. Ke, Yuan Yu, Yan Chen and Eliot Gillum, "BotGraph: Large Scale Spamming Botnet Detection," to appear in *USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, Apr. 2009

Y. Zhao, Z. Zhu, Y. Chen, D. Pei and J. Wang, "Towards Efficient Large-Scale VPN Monitoring and Diagnosis under Operational Constraints," to appear in Proc. of *Infocom*, Apr. 2009

Y. Zhao, Y. Chen and S. Ratnasamy, "Load balanced and Efficient Hierarchical Data-Centric Storage in Sensor Networks," in Proc. of *fifth IEEE Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON)*, 2008

Y. Gao, **Y. Zhao**, R. Schweller, S. Venkataraman, Y. Chen, D. Song, and M. Kao, "Detecting Stealthy Spreaders Using Online Outdegree Histograms," in Proc. of *the 15th IEEE International Workshop on Quality of Service (IWQoS)*, 2007

Y. Zhao and Y. Chen, "A Suite of Schemes for User-level Network Diagnosis without Infrastructure," in Proc. of *Infocom*, 2007

P. Narayana, R. Chen, **Y. Zhao**, Y. Chen, Z. Fu, and H. Zhou, "Automatic Vulnerability Checking of IEEE 802.16 WiMAX Protocols through TLA+," in Proc. of *the Second Workshop on Secure Network Protocols (NPSec)*, co-located with *ICNP* 2006

Y. Zhao, Y. Chen, and D. Bindel, "Towards Unbiased End-to-End Network Diagnosis," in Proc. of *ACM SIG-COMM*, Sep. 2006

Y. Zhao, Q. Zhang, B. Li, Y. Chen and W. Zhu, "Efficient HopID based Routing for Sparse Ad Hoc Networks," in Proc. of *the 13th IEEE International Conference on Network Protocols(ICNP)*, Nov. 2005

Y. Zhao, Y. Xiang, L. Xu and M. Shi, "A Multi-Channel Medium Access Control Protocol for Multicast in Mobile Ad-hoc Network," in Proc. of *IEEE International Symposium on Personal, Indoor and Mobile Radio Communications(PIMRC)*, Sep. 2003

Y. Zhao, Y. Xiang, L. Xu and M. Shi, "On-Demand Multicast Route Protocol with Multipoint Relay(ODMRP-MPR) in Mobile Ad-hoc Wireless Network," in Proc. of *International Conference on Communications Technology (ICCT)*, Beijing, China, Apr. 2003

PROFESSIONAL SERVICES

Reviewer of IEEE INFOCOM 2005, 2006, 2007 and 2008, SECON 2008, SecureComm 2008, IEEE GLOBECOM 2006, IWQoS 2006, IEEE Transactions on Vehicular Technology 2005, IEEE Wireless Communications Magazine 2005 and ACM MOBIHOC 2004

REFERENCES

Available upon request