Song Han

Department of Computer Sciences
The University of Texas at Austin
Austin, TX, 78741

Phone: 512-590-4554
www.cs.utexas.edu/~shan
shan@cs.utexas.edu

RESEARCH INTEREST

Real-Time Systems, Database Systems, Wireless Networks and Data Mining

EDUCATION

The University of Texas at Austin — Austin, TX, U.S.A
Ph.D. Candidate in Computer Science — *August 2006 ~ now*
Research Advisor: Prof. Aloysius K. Mok

City University of Hong Kong — Hong Kong, P. R. China
Master of Philosophy in Computer Science (GPA 4.0) — *June 2006*
Research Advisors: Dr. Kam-yiu Lam

Nanjing University — Nanjing, P. R. China
Bachelor of Science in Computer Science — *Aug. 2003*
Overall GPA: 87 /100, Major GPA: 89 /100, Mathematics GPA: 91 /100

AWARDS AND HONORS

Microelectronics and Computer Development (MCD) Fellowship, UT Austin	2006 - 2009
Excellent Graduate Award, Nanjing University, China	2003
People's Scholarship, Nanjing University, China	2000 - 2003
First Prize of "Hope-Cup" National Mathematical Contest for High School, China	1998

RESEARCH EXPERIENCE

DEPARTMENT OF COMPUTER SCIENCES, UNIVERSITY OF TEXAS AT AUSTIN

9/06 – now **Wireless HART Stack Implementation** In this project, we are implementing the Wireless HART stack co-working with Emerson Processing Management. Wireless HART is a secure, wireless mesh networking technology operating in the 2.4G ISM radio. The stack consists of physical layer, data link layer, network layer which embeds transport layer, and application layer. We are developing the prototype stack on top of 802.15.4 MAC supporting all features defined in the Wireless Hart specification with small footprint and low energy consumption to fit in wireless devices.

9/06 – now **Coding-aware Multi- path Routing in Wireless Networks** In this project, we are exploring a new multipath routing protocol considering the existing coding opportunity in wireless networks.

The novel feature of the new protocol is to actively change the routing paths during the packet transmission to create coding opportunities while not wait for them. The preliminary results have demonstrated that the overall network throughput can be significantly improved.

DEPARTMENT OF COMPUTER SCIENCE, CITY UNIVERSITY OF HONG KONG

4/05 – 7/06 **Transactions Scheduling in Real-Time Database System** A deferrable scheduling algorithm (DS-FP) for minimizing imposed workload while maintaining temporal validity of real-time data objects was proposed. We dynamically adjusted update transaction jobs' deadlines and separations by judiciously deferring their sampling times. Based on this work, we also proposed two DESH (Deferrable Scheduling with Hyperperiod) algorithms, DESH-SC and DESH-SA, to construct a hyperperiod schedule offline for the real-time update transactions to reduce online scheduling overhead while achieving CPU utilization close to that of DS-FP.

Advisors: Dr. Kam-yiu Lam and collaborate with Dr. Ming Xiong (Bell Laboratories)

8/04 - now **Statistics-Based Network Node Selection** The focus of this research is the selection of the right set of sensors for multiple sensor aggregation in order to obtain data values that are precise enough to meet the requirements of the probabilistic queries. We used a statistics based approach and derived different forms of probabilistic requirements for several common query types such as MIN, MAX and AVERAGE. After analyzing the impact of data on accuracy of query results, we proposed algorithms to determine the accuracy requirements of individual data items being queried.

Advisors: Dr. Kam-yiu Lam, Dr. Edward Chan and Dr. Reynold C. K. Cheng (Poly Univ. of HK)

12/03 - now **Location Management Scheme for Supporting LDCQ** In this project, we designed location management schemes to support location dependent continuous queries under different network scenarios. One scenario is that of a bandwidth constrained cellular network. We developed an adaptive update scheme that outperforms traditional time or distance based approaches. The second case studied is location update for supporting probabilistic LDCQs, for which we developed models and algorithms that allow users to trade-off fidelity requirements with the frequency updates.

Advisor: Dr. Edward Chan

8/04 - 1/05 **Energy Efficient Multipath Routing** We proposed the MRMS protocol (Multipath Routing in large scale sensor networks with Multiple Sink nodes) which incorporates multiple sink nodes, a new path cost metric for improving path selection, dynamic cluster maintenance and path switching to improve energy efficiency.

Advisor: Dr. Edward Chan

8/03 -12/03 **Continuous Energy Map Construction** We proposed a hierarchical approach to construct a continuous energy map of a sensor network in order to facilitate energy-efficient monitoring of sensor networks.

Advisor: Dr. Edward Chan

WORKING EXPERIENCE

Summer, 2007	Intern in Emerson Process Management. Implement the data link layer and network layer of Wireless HART standard.
Fall, 2005	Teaching Assistant in Dept. of Computer Science, City University of Hong Kong Course: CS3283 Distributed Systems
8/03 – 6/06	Research Assistant in Dept. of Computer Science, City University of Hong Kong
10/01 - 1/03	Software Developer in Nanjing University Developed a web information auto-collection system as well as a multimedia demonstration system for the 100th Anniversary of Nanjing University

PAPERS UNDER SUBMISSION

[1] Ming Xiong, **Song Han**, Deji Chen, K. Y. Lam. "DESH: Overhead Reduction Algorithms for Deferrable Scheduling", submitted to Real-Time Systems Journal.

[2] Ming Xiong, **Song Han**, K. Y. Lam, Deji Chen. "Deferrable Scheduling for Maintaining Real-Time Data Freshness: Algorithm, Analysis and Results", submitted to IEEE Transactions on Computers.

[3] **Song Han**, Edward Chan. "Hierarchy Energy Scan in Wireless Sensor Network using in-network aggregation", submitted to International Journal of Distributed Sensor Networks.

[4] **Song Han**, Edward Chan. "A Continuous Location Update Scheme for Supporting Probabilistic Range Queries in Mobile Networks", submitted to International Journal of Wireless and Mobile Computing.

[5] Jiangping Song, **Song Han**, Aloysius K. Mok, Deji Chen, Mark Nixon. "Centralized Control of Wireless Sensor Networks for Real-Time Applications", submitted to the 7th IFAC International Conference On Fieldbuses & Networks in Industrial & Embedded Systems.

PUBLICATIONS

[1] Jianping Song, **Song Han**, Aloysius K. Mok, Deji Chen, Mark Nixon, " A study of process data transmission scheduling in wireless mesh networks", to appear in ISA EXPO Technical Conference, 2007.

[2] **Song Han**, Edward Chan, Reynold Cheng, K. Y. Lam. "A Statistics-based Sensor Selection Scheme for Continuous Queries in Sensor Networks", In Real Time Systems Journal (RTS), Vol . 35, No. 1, pp. 33-58, Jan 2007.

[3] **Song Han**, Mike Sheldon, Deji Chen, Mark Nixon, Aloysius K. Mok. "A Practical Approach to Deploy Large Scale Wireless Sensor Networks", to appear in Handbook of Wireless Mesh & Sensor Networking, McGraw-Hill.

[4] Ming Xiong, **Song Han**, Deji Chen. "Deferrable Scheduling for Temporal Consistency: Schedulability Analysis and Overhead Reduction", to appear in Proc. 12th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA), 2006.

[5] Ming Xiong, **Song Han**, K. Y. Lam. "A Deferrable Scheduling Algorithm for Real-Time Transactions Maintaining Data Freshness" Proc. 26th IEEE Real-Time Systems Symposium (RTSS), 2005.

[6] **Song Han**, Edward Chan, Reynold Cheng, K. Y. Lam. "A Statistics-based Sensor Selection Scheme for Continuous Queries in Sensor Networks", Proc. 11th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA), 2005.

[7] **Song Han**, Edward Chan. "Probabilistic Continuous Update Scheme in Location Dependent Continuous Queries", Proc. 6th International Workshop on Advanced Parallel Processing Technologies (APPT), LNCS 2834, 2005.

[8] Yuequan Chen, Edward Chan, **Song Han**. "Energy Efficient Multipath Routing in Large Scale Sensor Networks with Multiple Sink Nodes", Proc. 6th International Workshop on Advanced Parallel Processing Technologies (APPT), LNCS 2834, 2005.

[9] **Song Han**, Edward Chan. "Hierarchy Energy Scan in Wireless Sensor Network using in-network aggregation", Proc. 2nd International Symposium on Parallel and Distributed Processing and Applications (ISPA), LNCS 3358, 2004.

[10] Feng Zou, Fu Lee Wang, Xiaotie Deng, **Song Han**, "Automatic Identification of Chinese Stop Words", Proc. 7th International Conference on Intelligent Text Processing and Computational Linguistics (Poster Session), 2006.

[11] Feng Zou, Fu Lee Wang, Xiaotie Deng, **Song Han**, "Evaluation of Stop Word List in Chinese Language", Language Resources and Evaluation (LREC) 2006.

COMPUTER SKILLS

Programming Languages: C, C++, Java
Simulation Tools: QualNet, MATLAB, C-SIM, IBM Aglet, Mica Mote and TinyOS.

REFERENCES:

Available upon Request