Xiaoyan Li

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Education

Rutgers, the State University of New Jersey, New Brunswick, NJ
Ph.D. in Computer Science — expected in May, 2006
Advisor: Prof. Richard P. Martin
Thesis: Spatial Characterization of Wireless Networks

M.S. in Computer Science — May, 2002

Tongji University, Shanghai, China
B.S. in Computer Science — July, 2000

Research Interests

My research interests span the areas of wireless sensor networks, ad hoc networks, distributed systems, and Internet services. I am particularly interested in using modeling, learning and mining techniques to explore system design issues.

Research Experience

Indoor Wireless Localization – Fall 2003 ~ present, with Prof. Richard P. Martin – As part of a research team, worked on analyzing and improving aspects of indoor wireless localization.

- Proposed an area-based presentation of localization results and designed an area-based localization algorithm - Area Based Probability (ABP).
- Characterized the fundamental limits of localization using received signal strength in indoor environments based on comparative studies on a group of indoor localization algorithms.
- Currently working on using algorithms fusion to improve indoor localization accuracy.

Signal Strength Modeling for Indoor 802.11 Networks – Fall 2004 ~ Spring 2005, with Prof. Richard P. Martin – Designed and implemented a signal strength model for indoor 802.11 networks that took into account the impact of indoor environment complexity.

- Designed a model that uses two intuitive parameters to capture the spatial environmental effects on signal strength distribution in indoor wireless networks.
- Demonstrated the accuracy of the model by using it to correctly predict the performance of an indoor localization application in various different indoor environments.

Transmission Power Control – Fall 2002 ~ Spring 2003, with Prof. Richard P. Martin and Prof. Thu D. Nguyen – Designed and evaluated a distributed node-transmission-power control algorithm for dense wireless networks based on a probabilistic model.

- Built a probabilistic model to represent one hop broadcast coverage in wireless networks and proposed an optimal transmission range extrapolation rule.
- Designed and evaluated an online distributed transmission power control algorithm based on the extrapolation rule that uses only local observation of network traffic.

Using Network Emulation and Fault-Injection to Quantify Performability in Cluster-based Services – Spring 2002 ~ Spring 2003, with Prof. Thu D. Nguyen and Prof. Richard P. Martin – Involved in the implementation of a comprehensive infrastructure for studying performability of cluster-based network servers.

Using Motes to Construct Spatial Web – Fall 2001, with Prof. Richard P. Martin – Took part in a project that used Berkeley Mica motes to dynamically construct web-like spatial infrastructure.

Cooperative Caching on Clusters – Summer 2001, with Prof. Thu D. Nguyen – Involved in the cooperative caching memory project which proposed a cooperative caching layer to improve the performance across a cluster of servers.

Publications: Refereed Conferences

Xiaoyan Li, Richard P. Martin, "A Simple Ray-Sector Signal Strength Model for Indoor 802.11 Networks", in *Proceedings of the Second IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS)*, Nov. 2005.

Xiaoyan Li, Thu D. Nguyen, Richard P. Martin, "Using Adaptive Range Control to Maximize 1-Hop Broadcast Coverage in Dense Wireless Networks", in *Proceedings of the First IEEE International Conference on Sensor and Ad hoc Communications and Networks (SECON)*, Oct. 2004.

Eiman Elnahrawy, Xiaoyan Li, Richard P. Martin, "The Limits of Localization Using Signal Strength: A Comparative Study", in *Proceedings of the First IEEE International Conference on Sensor and Ad hoc Communications and Networks (SECON)*, Oct. 2004.

Xiaoyan Li, Thu D. Nguyen, Richard P. Martin, "An Analytic Model Predicting the Optimal Range for Maximizing 1-Hop Broadcast Coverage in Dense Wireless Networks", in *Proceedings of the Third International Conference on AD-HOC Networks & Wireless (ADHOC-NOW)*, Jul. 2004.

Kiran Nagaraja, Xiaoyan Li, Bin Zhang, Ricardo Bianchini, Richard P. Martin, Thu D. Nguyen, "Using Fault Injection and Modeling to Evaluate the Performability of Cluster-Based Services", in *Proceedings of the Fourth USENIX Symposium on Internet Technologies and Systems (USITS)*, Mar. 2003.

Publications: Refereed Workshops

Andrew Tjang, Michael Pagliorola, Hiral Patel, Xiaoyan Li, Richard P. Martin, "Active Tapes: Bus-Based Sensor Networks", in *Proceedings of The First IEEE Workshop on Embedded Networked Sensors (EmNetS-I)* - short paper, Nov. 2004.

Eiman Elnahrawy, Xiaoyan Li, Richard P. Martin, "Using Area-based Presentations and Metrics for Localization Systems in Wireless LANs", in *Proceedings of the Fourth International IEEE Workshop on Wireless Local Networks (WLN)*, Nov. 2004.

Xiaoyan Li, Richard P. Martin, Kiran Nagaraja, Thu D. Nguyen, Bin Zhang, "Mendosus: A SAN-based Fault-Injection Test-Bed for Construction of Highly Available Network Services", in *Proceedings of the First Workshop on Novel Uses of System Area Networks (SAN-1)*, Feb. 2002.

Other Publications:

Eiman Elnahrawy, Xiaoyan Li, Richard P. Martin, "The Limits of Localization Using RSS", in *Proceedings of the Second ACM Conference on Embedded Networked Sensor Systems (SenSys)* – Poster Abstract, Nov. 2004.

Xiaoyan Li, Thu D. Nguyen, Richard P. Martin, "Using Adaptive Range Control to Optimize 1-Hop Broadcast Coverage in Dense Wireless Networks", in *Proceedings of the First ACM Conference on Embedded Networked Sensor Systems (SenSys)* – Poster Abstract, Nov. 2003.

Publications: Under Review

Yingying Chen, Konstantinos Kleisouris, Xiaoyan Li, Wade Trappe, Richard P. Martin, "The Robustness of Localization Algorithms to Signal Strength Attacks: A Comparative Study", Nov. 2005.

Teaching Experience

Instructor

Internet Technology - Fall 2005. Lectured on topics including the ISO/OSI network model, basic security, queuing theory and P2P systems. Coordinated with teaching assistants on the course design of syllabus, projects and exams.

Teaching Assistant

Operating Systems (Graduate Level) - Spring 2002. Responsibilities included project-design discussion with students and grading of projects. Projects covered design and implementation of Kernel system call, scheduling policy, file systems and distributed Internet service.

Operating Systems Design (Undergraduate) - Fall 2000, Spring 2001, Fall 2001. Responsibilities included lecturing on specific topics, designing and grading programming projects on inter process communication, multithreaded programming, virtual memory management and socket programming.

Data Structures - Summer 2001. Responsibilities included lecturing on specific topics, designing and grading programming projects on basic data structures, sorting/searching algorithms and complexity analysis.

Honors and Awards

Best Paper Award
IEEE International Conference on Sensor and Ad hoc Communications and Networks (SECON)
"The Limits of Localization Using Signal Strength: A Comparative Study" **Oct. 2004**

Ke-Lihua Scholarship from Ke-Lihua Computer Corporation, China **1996**

Student Travel Awards to attend
IEEE Conference on Mobile Ad-hoc and Sensor Systems (MASS) **Nov. 2005**
IEEE Conference on Sensor and Ad hoc Communications and Networks (SECON) **Oct. 2004**
ACM Conference on Embedded Networked Sensor Systems (SenSys) **Nov. 2003, Nov. 2004**

Activities and Affiliations

Reviewer for:
IEEE Transactions on Mobile Computing (TMC 2003, 2005)
ACM Annual International Conference on Mobile Computing and Networking (MobiCom 2004)
International Conference on Parallel Processing (ICPP 2004)
IEEE Transactions on Knowledge and Data Engineering (TKDE 2005)
IEEE Pervasive Computing (PC 2005)

Held office in the Computer Science Graduate Student Society (CSGSS) at Rutgers University, 2002 - 2003

IEEE student member since 2001

References

Prof. Richard P. Martin
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Prof. Badri Nath
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Miscellaneous

Citizenship: P.R.China
Visa: F-1