Hong Lu

Contact Information

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Research Interests

Areas: mobile computing, activity recognition and context inference
My research focuses on developing mobile inference systems for smart phones, which allow the phone to observe, understand, and even predict peoples activities, social interaction and context.

Education

Ph.D., Computer Science, **Dartmouth College** Sep. 2006 - present
- Advisor: Prof. Andrew T. Campbell and Prof. Tanzeem Choudhury
- Area of Study: ubiquitous computing, mobile system, and human behavior modeling

M.S. and B.S., Computer Science, **Tianjin Unviersity** Sep.1999 - Jun. 2006
- Advisor: Prof. Changming Ren
- Area of Study: Wireless Network

Professional Experience

Research Assisant Jun. 2007 - present
Mobile Sensing Group, Computer Science Department
Dartmouth College, Hanover, NH
My primarily interest is pushing AI into mobile sensing applications to analyze and model phone users' context and behavior. I have experience on various domains of mobile inference systems including: system architecture, power management, sensor data analysis and, most importantly, activity recognition. I prototype mobile systems on a variety of mainstream mobile phone platforms. My research papers appeared in a number of top conferences including MobiSys, Sensys, Pervasive and AAAI.

Research Intern Jun. 2010 - Sep. 2010
Microsoft Research, Redmond WA
Mentor: A.J. Brush and Bodhi Priyantha

- Studied continuous audio sensing and speaker identification on heterogeneous multi-processor (HMP) mobile phone architecture.
- Implemented a prototype on HTC HD2 smart phone with LittleRock sensor board.
- Filed one patent, SpeakerSense paper accepted by Pervasive 2011 (Best Paper Nominee).

Research Intern Oct. 2009 - Dec. 2009
Nokia Research Center, Palo Alto, CA
Supervisor: Zhigang Liu

- Designed and implemented Jigsaw, a robust context/activity recognition engine for smart phones using the on-board accelerometer, microphone and GPS sensors.
- Implemented a daily activity tracking and logging application with the Jigsaw engine.
- Filed three IPs and one patent, Jigsaw paper accepted by SenSys 2010.

Research Intern Jun. 2009 - Sep. 2009
Nokia Research Center, Palo Alto, CA
Supervisor: Zhigang Liu

- Designed and Analyzed motion based gesture recognition technique for 8 Nokia gestures.
- Developed a software toolkit for continuous sensor data collection, annotation, feature extraction and visualization on Nokia mobile phones.

Teaching Assisant Sep. 2006 - Sep. 2007

Dartmouth College, Hanover, NH

- Teaching Assistant for CS39 Theory of Computation.
- Teaching Assistant for CS38 Security and Privacy.
- Teaching Assistant for CS23 Software Engineering.

Book Chapter

Jun Yang, **Hong Lu**, Zhigang Liu and Pter Pl Boda, *Physical Activity Recognition with Mobile Phones: Challenges, Methods, and Applications*, Multimedia Interaction and Intelligent User Interfaces Advances in Pattern Recognition, 2010, 185-213.

Selected Publications

Hong Lu, A.J. Brush, Bodhi Priyantha, Amy Karlson, Jie Liu, *Energy Efficient Unobtrusive Speaker Identification on Mobile Phones*. Proc. of the Ninth International Conference on Pervasive Computing(Pervasive 2011) [**Best Paper Nominee**].

Nicholas D. Lane, Ye Xu , **Hong Lu** , Shaohan Hu, Tanzeem Choudhury and Andrew T. Campbell, Enabling Large-scale Human Activity Inference on Smartphones using Community Similarity Networks (CSN), 13th International Conference on Ubiquitous Computing (Ubicomp 2011) [**Best Paper Nominee**].

Hong Lu, Jun Yang, Zhigang Liu, Nicholas D. Lane, Tanzeem Choudhury, Andrew T. Campbell, *The Jigsaw Continuous Sensing Engine for Mobile Phone Applications*. Proc. of 8th ACM Conference on Embedded Networked Sensor Systems (SenSys 2010).

Andrew T. Campbell, Tanzeem Choudhury, Shaohan Hu, **Hong Lu**, Matthew K. Mukerjee, Mashqui Rabbi, and Rajeev D. S. Raizada, *NeuroPhone: Brain-Mobile Phone Interface using a Wireless EEG Headset*. Proc. of The Second ACM SIGCOMM Workshop on Networking, Systems, and Applications on Mobile Handhelds (MobiHeld'10).

Daniel Peebles, **Hong Lu**, Nicholas D. Lane, Tanzeem Choudhury, Andrew Campbell, *Community-Guided Learning: Exploiting Mobile Sensor Users to Model Human Behavior*. Proc. of 24th AAAI Conference on Artificial Intelligence (AAAI '10).

Hong Lu, Nicholas D. Lane, Shane B. Eisenman and Andrew T. Campbell, *Bubble-sensing: Binding sensing tasks to the physical world*, Journal of Pervasive and Mobile Computing.

Hong Lu, Wei Pan, Nicholas Lane, Andrew Campbell, Tanzeem Choudhury, *SoundSense: Scalable Sound Sensing for People-Centric Applications on Mobile Phones*. Proc. of the 7th international conference on Mobile systems, applications, and services(Mobisys 2009).

Emiliano Miluzzo, Nicholas D. Lane, Kristof Fodor, Ronald Peterson, **Hong Lu**, Mirco Musolesi, Shane B. Eisenman, Xiao Zheng, Andrew T. Campbell, *Sensing Meets Mobile Social Networks: The Design, Implementation and Evaluation of the CenceMe Application*, Proc. of Seventh ACM Conference on Embedded Network Sensor Systems (Sensys 2008).

Nicholas D. Lane, **Hong Lu**, Shane B. Eiseman and Andrew T. Campbell, *Cooperative Techniques Supporting Sensor-based People-centric Inferencing*, Proc. of Pervasive 2008.

Committee

Technical program committee(TPC) member of the MobiSense Workshop, in conjunction with Pervasive 2011, San Francisco, USA.

Selected News and Press

- Nokia toys with context-aware smartphone settings switch, Jigsaw provides better context for apps like this, `Engadget`, Nov 2010.
- Smartphone app monitors your every move, `NewScientist`, 26 November 2010. .
- Mobile Phone Mind Control, `TechnologyReview`, March, 2010.
- Cell phones that listen and learn, `TechnologyReview`, June, 2009.
- Cell Phones That Learn the Sounds of Your Life, `Slashdot`, July, 2009

Expertise

Programming Language: C, JAVA, MATLAB.

Environments: Eclipse, Xcode, VI/GCC.

Operating Systems: Linux, Windows, iOS, Nokia Maemo, Android.