

# Jierui Xie

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**I am looking for a R&D position.**

## Research Background (see papers for details)

My general research interests include **data mining**, **machine learning** and **social network analysis (SNA)** for large-scale datasets or networks. I have background in

- **Fast community detection in social networks** (e.g., linear-time overlapping communities detection)
- Opinion/influence spreading in social networks (e.g., tipping point analysis in Binary agreement model)
- Pattern/event/human activity recognition for context-aware applications (e.g., from multi-modal/multi-scale sensor signals using Scale-invariant feature, HMM, PCFG, VOGUE)
- Learning similarity/dissimilarity for categorical data (e.g., for protein sequence classification)
- Density based anomaly detection/change detection (e.g., for sensor signal stream)
- Text mining (e.g., burstiness-aware doc search/retrieval/ranking from News stream)
- Simulation of stochastic dynamics in networks (e.g., on ER, BA, WS, CM)
- Resource optimization using neural networks (using Hopfield, simulated annealing)
- Routing protocol in wireless sensor networks

## Education

- 2007-present: Ph.D. in Computer Science, Rensselaer Polytechnic Institute, New York, USA
  - Committee: **Boleslaw Szymanski** (advisor), **Mohammed J. Zaki**, **Mark K. Goldberg**, **Gyorgy Korniss**
  - Dissertation: Opinion dynamics and community detection in large-scale networks
  - GPA: 3.93/4.0
- 1998-2004: B.S./M.S. in Computer Science, South China Agricultural University, China
  - M.S. thesis: Hopfield Network for Resource Leveling Problem

## Work Experience

- Jun.-Aug 2009: **Intern** at **IBM T.J. Watson Research Center**. Mentor: David Wood. I designed and developed a prototype for sensor monitoring and fault management system in battlefield scenario. (a) Provide an interactive monitor interface (e.g., check the status of sensors); (b) Provide an algorithm to identify the location of events (e.g., gunshot); (c) Provide an optimal sensor selection algorithm based on the utility function and data access policy; (d) Results are demonstrated in the International Technology Alliance (ITA) annual conference; (e) Developed in Java, Servlet, Javascript/AJAX and XML.
- Jun.-Aug 2008: **Intern** at **IBM T.J. Watson Research Center**. Mentor: Mandis Beigi. I designed and developed a framework for human activity recognition from sensor streams and anomaly detection. (a) Work with passive infrared, seismic, accelerometer, magnetic, electronic field and acoustic sensors; (b) Provide an algorithm to extract and encode scale-invariant features of the raw signals based on SIFT; (c) Provide an evaluation metric based nearest neighbor matching and dynamic time warping (DTW); (d) Provide a density based change detection algorithm for detecting abnormal events; (e) The work was published in ICME2009; (f) Developed in Matlab
- 2004-2007: **Instructor** at Dept. of Computer Science, South China Agricultural University, China. I taught "C programming Language" and "Database Principle and Application".

## Selected Publications

### Fast Community Detection in Social Networks

1. **J. Xie** and B. Szymanski, "LabelRankT: An Efficient Distributed Algorithm for Community Detection in Dynamic Networks", submitted to CIKM 2012.
2. **J. Xie**, S. Kelley and B. Szymanski, "Overlapping Community Detection in Networks: the State of the Art and Comparative Study", ACM Computing Surveys, 2012
3. **J. Xie** and B. Szymanski, "Towards Linear Time Overlapping Community Detection in Social Networks", PAKDD 2012.
4. **J. Xie**, B. K. Szymanski and X. Liu, "SLPA: Uncovering Overlapping Communities in Social Networks via a Speaker-listener Interaction Dynamic Process", in workshop DMCCI (with ICDM)

2011.

5. **J. Xie**, B. K. Szymanski, "Community Detection Using a Neighborhood Strength Driven Label Propagation Algorithm", IEEE NSW, 2011.

### **Pattern Recognition and Machine Learning**

1. **J. Xie**, B. Szymanski, and M. Zaki. "Learning Dissimilarities for Categorical Symbols". Journal of Machine Learning Research, vol 10, pp: 97-106, 2010.
2. S. Geyik, **J.Xie**, B. Szymanski, "Behavior Modeling with Probabilistic Context Free Grammars", International Conference on Information Fusion 2010.
3. **J. Xie**, M. Beigi. "A Scale-invariant Local Descriptor for Event Recognition in 1D Sensor Signals", International Conference on Multimedia & Expo (ICME) 2009.
4. A. Hoonlor, **J. Xie**, V. Chaoji, B. Szymanski, M. Zaki, Document Retrieval and Event Date Estimation Using Bursty Period Detection, Tech Report.
5. C. Liu, **J. Xie** and Y. Hu. "Using Hopfield Neural Network to Solve Resource-leveling Problem". Proc. of the 11th joint international computer conference (JICC), pp:564-567, 2005.

### **Opinion Dynamics in Social Networks**

1. **J. Xie**, J. Emenheiser, M. Kirby, S. Sreenivasan, B. Szymanski and G. Korniss. "Evolution of Opinions on Social Networks in the Presence of Competing Committed Groups", 2012, **PLoS ONE** ( **impact factor 4.4**)
2. **J. Xie**, S. Sreenivasan, G. Korniss, W. Zhang, C. Lim, B. K. Szymanski, "Social Consensus through the Influence of Committed Minorities", **Physical Review E**. 2011. (Featured at RPI news, ACM news, Discovery News, The Atlantic, Science News, Canadian radio science program etc.)
3. W. Zhang, C. Lim, S. Sreenivasan, **J. Xie**, B.K. Szymanski, G. Korniss, "Social Influencing and Associated Random Walk Models: Asymptotic Consensus Times on the Complete Graph", Chaos: An Interdisciplinary Journal of Nonlinear Science, 2011.

For previous work on computer/sensor networks, refer to long version cv.

### **Talk and Poster**

- CompleNet 2012, Florida; WIDS 2011, MIT, Boston; IBM, Aug. 2008.
- Greater Boston Area Statistical Mechanics Meeting (GBASM), 2010 and 2011, Boston.

### **Technical Committee Member & Reviewer**

- 2011, Reviewer, Knowledge and Information Systems Journal, International Journal of Communication Networks and Distributed Systems- Special Issue Science of Smarter Planet Systems
- 2009, Reviewer, IEEE Network Special Issue on Bio-Inspired Communications, Computers and Informatics Journal, IEEE International Symposium on Wireless Communication Systems.
- 2007, PC Members of Computer and Network Security Symposium, CHINACOM 2007
- 2006, Reviewer for CHINACOM 2006.

### **Computer Skill**

- Programming: **C/C++**, **Java**, **MatLab**, VB; Prolog, Python, Scheme, Assembly
- Parallel: MPI (MPICH2)
- Web design: JavaScript, Servlet, HTML, AJAX, ASP, Dreamweaver
- Database: SQL server, Access
- OS: Windows, Ubuntu, TinyOS
- Other: Weka, UML

### **Software**

- 2011: **SLPA** (open source), I designed and implemented a linear time algorithm for detecting community structure in large social networks. For a two million nodes network, it takes only 6 minutes. It is freely available online in **C++**, **Java**, **Matlab** and **MPI**. The work is published in DMCCI 2011 and PAKDD 2012. Available at <https://sites.google.com/site/communitydetectionslpa/>

### **Award/RA/TA**

- RA 2009, 2010, 2011; TA for Computer organization, Computation complexity, Machine learning
- ICDM 2011 Student Travel Awards