Fangjian Guo

Personal Information

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Education

2013 – present — **Duke University**, Durham, NC, USA.
PhD program in computer science

2009 – 2013 — **University of Electronic Science and Technology of China**, Chengdu, P.R.China.
B.Eng. in computer science and technology
Graduation with the highest distinction
GPA: **3.89**/4.00 (**92.6**/100)   Ranking: **1**/110

Research Interests

Machine learning, Bayesian statistics and statistical physics. Modeling and understanding complex systems, including neural systems, human behaviors, social network, etc.

Research Experience

Dec 2012– Feb 2013 — **Growth Trajectories and Causal Mechanisms of Evolution for Social Networks**, *advised by Prof. Jonathan Zhu*.
Web Mining Lab, City University of Hong Kong

Aug 2012– May 2013 — **The Memory of Power-law Series**, *advised by Prof. Tao Zhou*.
Web Sciences Center, School of Computer Science and Engineering, UESTC

Power-law distribution emerges in empirical data from human activities and complex systems. We study how power-law naturally imposes a constraint on the memory (first-order autocorrelation) of random series, which may explain why most of empirical power-law series are found to be positively autocorrelated. It may also lead to a better measure of temporal correlations.

◇ Derived analytically the non-trivial bounds for the memory of permuted i.i.d. power-law sequence as a function of the exponent.
◇ Analyzed the asymptotic behavior of diverging moments with approximation methods.
◇ Validated theoretical results with both numerical simulations and empirical data.

July 2012– Aug 2012	**Inverse Ising Problem with Pseudolikelihood Maximization**, *advised by Prof. Haijun Zhou.* Institute of Theoretical Physics, Chinese Academy of Sciences ◇ Implemented the algorithm for learning interactions by maximizing pseudolikelihood. ◇ Evaluated the algorithm by feeding samples from Monte Carlo simulation with different sizes and temperatures.
Feb 2012– June 2012	**Predicting Link Directions via a Recursive Subgraph-based Ranking**, *advised by Prof. Tao Zhou.* Web Sciences Center, School of Computer Science and Engineering, UESTC For incomplete directed networks, ranking is applied to the problem of predicting link directions by using other links. We propose a solution by first ranking nodes in a specific order and then predicting these links as stemming from a lower-ranked node towards a higher-ranked one. ◇ Collaborated with coauthors to develop the ranking algorithm. ◇ Analyzed the performance of the algorithm with empirical data.

Academic Activities

July 2012	CCAST summer school on statistical physics and complex systems. Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing

Honors and Awards

2013	**Duke Fellowship** The Graduate School, Duke University
2012	**Outstanding Winner** in 2012 Mathematical/Interdisciplinary Contest in Modeling (17 out of 5,024 teams, 0.3%). COMAP, sponsored by SIAM, NSA and INFORMS
2012	**Outstanding Student** of the University (10 out of 4,500 undergraduates, 0.2%). University of Electronic Science and Technology of China
2010 – 2011 and 2009 – 2010	**National Scholarship** (Top 1%). Ministry of Education of China

Skills

Programming	C/C++, Python, MATLAB, R
Typesetting	LaTeX
Language	Chinese (native), English (fluent)

Publications

[1] **Fangjian Guo**, Zimo Yang, and Tao Zhou. Predicting link directions via a recursive subgraph-based ranking. *Physica A*, 392(16), 2013.

[2] **Fangjian Guo**, Jiang Su, and Jian Gao. Finding conspirators in the network via machine learning. *The UMAP Journal*, 33(3), 2012. **(Outstanding Winner paper for MCM/ICM 2012)**

[3] **Fangjian Guo** and Tao Zhou. The relation between memory and power-law exponent. (in preparation).