



## 微博关注关系网络K-核结构实证分析

白林根, 谌志群, 王荣波, 黄孝喜

杭州电子科技大学认知与智能计算研究所 杭州 310018

Bai Lingen, Chen Zhiqun, Wang Rongbo, Huang Xiaoxi

Institute of Cognitive and Intelligent Computing, Hangzhou Dianzi University, Hangzhou 310018, China

- 摘要
- 参考文献
- 相关文章

Download: PDF (597KB) [HTML](#) (1KB) Export: BibTeX or EndNote (RIS) Supporting Info

**摘要** 为研究微博关注关系网络的特征,以新浪微博为例,引入复杂网络分析方法对微博关注关系网络进行实证分析。首先对微博关注关系网络进行K-核分解,获取微博核心用户关系网络。然后计算K-核网络基本参数、跟随比例和度相关性,发现其既具有在线社会网络的一般特征,也具有现实社会网络的一些特点。通过对K-核网络的社区检测及节点中心性、互惠性、中间人角色的分析,发现其网络结构具有明显的社区特性。该研究能够为相关应用提供实证基础。

**关键词:** 微博关注关系 K-核分解 社区检测 复杂网络

**Abstract:** In order to study the features of microblog following relationship network, the analysis method based on complex network is applied to analyze the following relationship of Sina Microblog in this paper. Firstly, the K-core decomposition operation is performed on a microblog following relationship network to obtain a core user's relationship network. Secondly, the features of online community network and those of realistic society network can be received in the K-core network by computing the basic parameters of the K-core network, following ratio and degree correlation. Finally, a conclusion can be obtained that the community characteristic of the network structure is very obvious by community detecting on the K-core network and analysis of the node centrality, reciprocity and the role of brokerage. Experimental results show that the research work of this paper can provide effectively a fundamental empirical analysis for related applications.

**Keywords:** Microblog following relationship, K-core decomposition, Community detection, Complex network

收稿日期: 2013-07-25;

基金资助: 本文系国家自然科学基金项目“引入涉身认知机制的汉语隐喻计算模型及其实现”(项目编号: 61103101)、国家自然科学基金项目“基于马尔科夫树与DRT的汉语句群自动划分算法研究”(项目编号: 61202281)和教育部人文社会科学研究项目“面向信息处理的汉语隐喻研究”(项目编号: 10YJCZH052)的研究成果之一。

通讯作者 白林根 Email: blg501@163.com

引用本文:

白林根, 谌志群, 王荣波等. 微博关注关系网络K-核结构实证分析[J]. 现代图书情报技术, 2013, V29(11): 68-74

Bai Lingen, Chen Zhiqun, Wang Rongbo etc. Empirical Analysis on K-core of Microblog Following Relationship Network[J], 2013, V29(11): 68-74

链接本文:

<http://www.infotech.ac.cn/CN/> 或 <http://www.infotech.ac.cn/CN/Y2013/V29/I11/68>



- [1] 刘挺, 徐志明, 秦兵, 等. 从语言计算到社会计算[J]. 中国计算机学会通讯, 2011, 7(12): 31-39. (Liu Ting, Xu Zhiming, Qin Bing, et al. From Language Computing to Social Computing[J]. *Communications of the China Computer Federation*, 2011, 7(12): 31-39.)
- [2] Guo Z, Li Z, Tu H. Sina Microblog: An Information-driven Online Social Network[C]. In: *Proceedings of the 2011 International Conference on Cyberworlds*. 2011: 160-167.
- [3] 汪小帆, 李翔, 陈关荣. 网络科学导论[M]. 北京: 高等教育出版社, 2012. (Wang Xiaofan, Li Xiang, Chen Guanrong. *Network Science: An Introduction* [M]. Beijing: Higher Education Press, 2012.)
- [4] Mislove A, Marcon M, Gummadi K P, et al. Measurement and Analysis of Online Social Networks[C]. In: *Proceedings of the 7th ACM SIGCOMM Conference on Internet Measurement*. New York, NY, USA: ACM, 2007: 29-42.
- [5] Java A, Song X, Finin T, et al. Why We Twitter: Understanding Microblogging Usage and Communities[C]. In: *Proceedings of the 9th WebKDD*

### Service

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ Email Alert
- ▶ RSS

### 作者相关文章

- ▶ 白林根
- ▶ 谌志群
- ▶ 王荣波
- ▶ 黄孝喜

- [6] Teutle A R M. Twitter: Network Properties Analysis[C].In: *Proceedings of the 20th International Conference on Electronics, Communications and Computer (CONIELECOMP)*.Washington DC: IEEE Computer Society,2010:180-186.
- [7] Kwak H, Lee C, Park H,et al. What is Twitter, A Social Network or a News Media? [C]. In: *Proceedings of the 19th International Conference on World Wide Web*, Raleigh,USA. New York,NY,USA: ACM,2010: 591-600.
- [8] 胡海波,徐玲,王科,等. 大型在线社会网络结构分析[J]. 上海交通大学学报, 2009,43(4):587-591. (Hu Haibo,Xu Ling,Wang Ke,et al. Structural Analysis of Large Online Social Network[J]. *Journal of Shanghai Jiaotong University*, 2009,43(4):587-591.)
- [9] 余高辉,杨建梅,曾敏刚. QQ群好友关系的复杂网络研究[J]. 华南理工大学学报:社会科学版, 2011,13(4):20-23. (Yu Gaohui,Yang Jianmei,Zeng Mingang. Research on QQ Group Based on Complex Networks[J].*Journal of South China University of Technology: Social Science Edition*, 2011,13(4):20-23.)
- [10] 王晓光,袁毅,滕思琦. 微博社区交流网络结构的实证分析[J]. 情报杂志, 2011,30(2):199-203.(Wang Xiaoguang, Yuan Yi, Teng Siqi. Empirical Analysis on Communicating Structure of Micro-blog Community[J].*Journal of Intelligence*,2011, 30(2):199-203.)
- [11] 袁毅,杨成明. 微博客用户信息交流过程中形成的不同社会网络及其关系实证研究[J]. 图书情报工作, 2011,55(12):31-35.(Yuan Yi, Yang Chengming. Empirical Analysis of All Kinds of Social Networks and Their Relationships Formed by Information Communication Among Microblog Users[J]. *Library and Information Service*, 2011,55(12):31-35.)
- [12] 何黎,何跃,霍叶青. 微博用户特征分析和核心用户挖掘[J]. 情报理论与实践, 2011, 34(11):121-125. (He Li, He Yue, Huo Yeqing. Microblogging User Characteristics Analysis and Mining Core Users[J]. *Information Studies: Theory & Application*, 2011,34(11):121-125.)
- [13] Kang S, Zhang C, Lin Z,et al. Complexity Research of Massively Microblogging Based on Human Behaviors[C]. In: *Proceedings of the 2nd International Workshop on Database Technology and Applications(DBTA)*,Wuhan,China. 2010:1-4.
- [14] 田占伟,隋场. 基于复杂网络理论的微博信息传播实证分析[J]. 图书情报工作, 2012,56(8):42-46. (Tian Zhanwei,Sui Yang. The Empirical Analysis of Micro-blog Information Flow Based on Complex Network Theory[J]. *Library and Information Service*, 2012,56(8):42-46.)
- [15] Fan P, Li P, Jiang Z,et al. Measurement and Analysis of Topology and Information Propagation on Sina-Microblog[C]. In: *Proceedings of the IEEE International Conference on Intelligence and Security Informatics(ISI)*.Washington DC: IEEE Computer Society, 2011:396-401.
- [16] 梁斌. 新浪微博用户信息[DB/OL]. [2012-06-05]. <http://www.cnpameng.com>. (Liang Bin. User's Information of Sina Weibo[DB/OL]. [2012-06-05]. <http://www.cnpameng.com>.)
- [17] 胡海波,王科,徐玲,等. 基于复杂网络理论的在线社会网络分析[J]. 复杂系统与复杂性科学, 2008,5(2):1-14.(Hu Haibo,Wang Ke,Xu Ling,et al. Analysis of Online Social Networks Based on Complex Network Theory[J]. *Complex Systems and Complexity Science*, 2008,5(2):1-14.) 
- [18] Pons P, Latapy M. Computing Communities in Large Networks Using Random Walks[C]. In: *Proceedings of the 20th International Conference on Computer and Information Sciences*, Istanbul, Turkey.Berlin, Heidelberg: Springer-Verlag, 2005:284-293.
- [19] 张春红,于翠波,朱新宁,等. 社交网络(SNS)技术基础与开发案例[M]. 北京: 人民邮电出版社, 2012. (Zhang Chunhong, Yu Cuibo, Zhu Xinning, et al. Social Network Services Technology Base and Develop Case[M]. Beijing: Posts & Telecom Press,2012.)
- [20] 刘军. 整体网分析讲义:UCINET软件实用指南[M]. 上海: 格致出版社, 2009.(Liu Jun. Lectures on Whole Network Approach: A Practical Guide to UCINET[M]. Shanghai: Truth & Wisdom Press, 2009.) 
- [1] 赵辉,刘怀亮.面向用户生成内容的短文本聚类算法研究[J]. 现代图书情报技术, 2013,29(9): 88-92
- [2] 李盛庆,蔡国永.复杂网络领域科研合著网络演化及知识传播特点研究[J]. 现代图书情报技术, 2013,(5): 64-72
- [3] 魏静,朱恒民,洪小娟,宋瑞晓,许赞.基于复杂在线网络的舆情传递研究——进化博弈视角[J]. 现代图书情报技术, 2013,29(3): 65-70
- [4] 赵辉,刘怀亮,范云杰.复杂网络理论在中文文本特征选择中的应用研究[J]. 现代图书情报技术, 2012,(9): 23-28
- [5] 刘红红,安海忠,高湘响.基于文本复杂网络的内容结构特征分析[J]. 现代图书情报技术, 2011,27(1): 69-73
- [6] 马超,叶祺,吴斌,石川,余影.基于动态链接分析的网络可视化分析平台的设计与实现\*[J]. 现代图书情报技术, 2010,26(6): 60-65
- [7] 孙文俊,王谦.基于拉普拉斯谱分析的真伪科学论文甄别研究[J]. 现代图书情报技术, 2010,26(5): 58-65
- [8] 彭红彬,王军.虚拟社区中知识交流的特点分析——基于CSDN技术论坛的实证研究[J]. 现代图书情报技术, 2009,25(4): 44-49
- [9] 王建冬.基于复杂网络方法的国内信息服务研究概念网络分析[J]. 现代图书情报技术, 2009,(10): 56-61
- [10] 王建冬,王继民,田飞佳.博客圈的特征及其演化机制初探\*[J]. 现代图书情报技术, 2008,24(4): 56-60