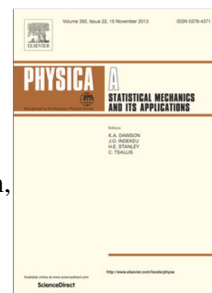


Accepted Manuscript

Compressive sensing of high betweenness centrality nodes in networks

Hamidreza Mahyar, Rouzbeh Hasheminezhad, Elahe Ghalebi K., Ali Nazemian, Radu Grosu, Ali Movaghar, Hamid R. Rabiee



PII: S0378-4371(17)31394-8
DOI: <https://doi.org/10.1016/j.physa.2017.12.145>
Reference: PHYSA 19075

To appear in: *Physica A*

Received date : 30 June 2017
Revised date : 18 November 2017

Please cite this article as: H. Mahyar, R. Hasheminezhad, E. Ghalebi K., E. Ghalebi K., A. Nazemian, R. Grosu, A. Movaghar, H.R. Rabiee, Compressive sensing of high betweenness centrality nodes in networks, *Physica A* (2018), <https://doi.org/10.1016/j.physa.2017.12.145>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Compressive Sensing of High Betweenness Centrality Nodes in Networks

Hamidreza Mahyar^a, Rouzbeh Hasheminezhad^b, Elahe Ghalebi K.^c, Ali Nazemian^d, Radu Grosu^c, Ali Movaghar^d, Hamid R. Rabiee^d

^a*Faculty of Science and Engineering, International Campus-Kish Island, Sharif University of Technology (SUT)*

^b*Department of Computer Science, ETH Zurich (ETHZ)*

^c*Institute of Computer Engineering, Vienna University of Technology (TU Wien)*

^d*Department of Computer Engineering, Sharif University of Technology (SUT)*

Abstract

Betweenness centrality is a prominent centrality measure expressing importance of a node within a network, in terms of the fraction of shortest paths passing through that node. Nodes with high betweenness centrality have significant impacts on the spread of influence and idea in social networks, the user activity in mobile phone networks, the contagion process in biological networks, and the bottlenecks in communication networks. Thus, identifying k -highest betweenness centrality nodes in networks will be of great interest in many applications. In this paper, we introduce CS-HiBet, a new method to efficiently detect top- k betweenness centrality nodes in networks, using compressive sensing. CS-HiBet can perform as a distributed algorithm by using only the local information at each node. Hence, it is applicable to large real-world and unknown networks in which the global approaches are usually unrealizable. The performance of the proposed method is evaluated by extensive simulations on several synthetic and real-world networks. The experimental results demonstrate that CS-HiBet outperforms the best existing methods with notable improvements.

Keywords: Compressive Sensing, Betweenness Centrality, Complex Network

Email addresses: hmahyar@ce.sharif.edu (Hamidreza Mahyar), shashemi@student.ethz.ch (Rouzbeh Hasheminezhad), eghalebi@cps.tuwien.ac.at (Elahe Ghalebi K.), nazemian@ce.sharif.edu (Ali Nazemian), radu.grosu@tuwien.ac.at (Radu Grosu), movaghar@sharif.edu (Ali Movaghar), rabiee@sharif.edu (Hamid R. Rabiee)

Download English Version:

<https://daneshyari.com/en/article/7375929>

Download Persian Version:

<https://daneshyari.com/article/7375929>

[Daneshyari.com](https://daneshyari.com)