

Accepted Manuscript

A Distance-based Spectral Clustering Approach with Applications to Network Community Detection

Gang Shen, Dongmei Ye

PII: S2452-414X(16)30093-0
DOI: [10.1016/j.jii.2017.02.005](https://doi.org/10.1016/j.jii.2017.02.005)
Reference: JII 28



To appear in: *Journal of Industrial Information Integration*

Received date: 1 November 2016
Revised date: 15 February 2017
Accepted date: 15 February 2017

Please cite this article as: Gang Shen, Dongmei Ye, A Distance-based Spectral Clustering Approach with Applications to Network Community Detection, *Journal of Industrial Information Integration* (2017), doi: [10.1016/j.jii.2017.02.005](https://doi.org/10.1016/j.jii.2017.02.005)

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.

A Distance-based Spectral Clustering Approach with Applications to Network Community Detection

Gang Shen* and Dongmei Ye†

School of Software Engineering
Huazhong University of Science and Technology
Wuhan 430074, China

*gangshen@hust.edu.cn, corresponding author

†778562252@qq.com

Abstract

Spectral clustering is an important unsupervised learning approach to many object partitioning and pattern analysis problems. In this paper, we present our work on a novel spectral clustering algorithm that groups a collection of objects using the spectrum of the pairwise distance matrix. If the points in a metric space can be associated with a well defined distance, it is proven that the pairwise distance matrix is almost negative definite, and we show that the eigenvectors for its most significant negative eigenvalue can be used to approximate the solution to a quadratic binary partition problem. We define the quality measures for the one dimensional partitioning of the eigenvector entries, which are further applied to evaluate the partitioning results for the data points projected into the space spanned by the selected eigenvectors. Since the Lanczos iterative algorithm may be revised to find the eigenvalues efficiently in a distributed way, we adapt this algorithm to the network community detection problem using a decentralized multi-agent framework. The performance of the proposed approach is tested with different datasets, and the empirical experiments show that this approach is able to enhance the effectiveness of clustering.

Download English Version:

<https://daneshyari.com/en/article/4973037>

Download Persian Version:

<https://daneshyari.com/article/4973037>

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