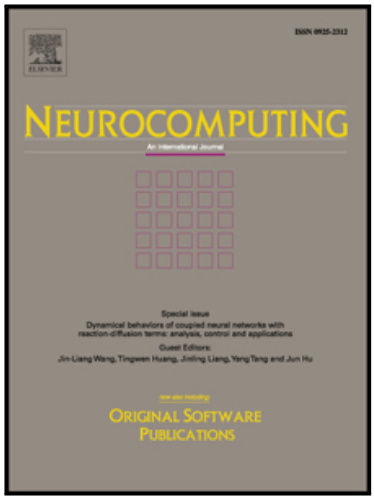
Communicated by Dr. Muhammet Uzuntarla

Accepted Manuscript



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PII: S0925-2312(17)31507-2
DOI: 10.1016/j.neucom.2017.09.013
Reference: NEUCOM 18870

To appear in: *Neurocomputing*

Received date: 4 April 2017
Revised date: 11 June 2017
Accepted date: 5 September 2017

Please cite this article as: Pengfei Jiao, Wenjun Wang, Di Jin, Constrained Common Cluster based Model for Community Detection in Temporal and Multiplex Networks, *Neurocomputing* (2017), doi: 10.1016/j.neucom.2017.09.013

Constrained Common Cluster based Model for Community Detection in Temporal and Multiplex Networks

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Abstract

On one hand, the detection of tightly connected groups, also known as community detection in complex networks, is a prominent problem for network analysis and mining. On the other hand, almost all of social, biological, bibliographic, communication and computer systems are modeled as temporal networks, the topological structures of which evolve with time, or multiplex networks, each pair of nodes of which has multiple linked relations. Current methods of community detection for temporal networks are based on incremental, independent or evolutionary clustering, and for multiplex networks are based on fusion of the multiple links. However, all these methods ignore the common structure hidden in the networks, which is denoted as the common cluster here. So in this paper, we propose a constrained common cluster based model (C^3 model) to analyze the temporal and multiplex networks, which can not only detect the community structure, but also identify the importance of each node based on the common cluster structure of both two classes of networks. The intrinsic assumption of the proposed model is that there are common or coincident clusters hidden in these networks. In detail, we first construct the Markov steady-state matrices of each snapshot of temporal network or each slice of multiplex network. Next,

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