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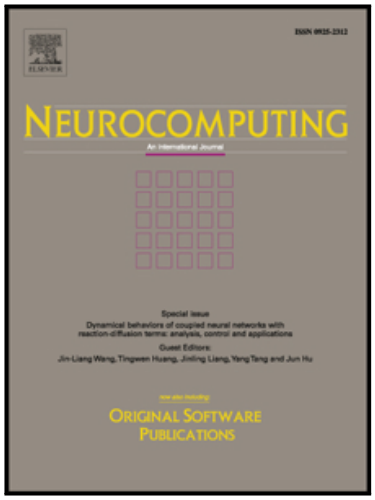

Learning Community Structures: Global and Local Perspectives

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Learning Community Structures: Global and Local Perspectives

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Abstract

Uncovering community structures is a fundamental and important problem for analyzing complex networks. The topology information, as the direct representation of networks, is widely used for community detection. But in fact, there are another two important types of information related with network topology: the *global* information which captures the importance of nodes in the whole network, and the *local* information which describes the similarities between nodes. It is of great value to consider the information of individual nodes and information between them for community detection methods simultaneously, which is largely ignored by previous methods. In this work, we integrate the global and local information uniformly in a novel nonnegative matrix factorization (NMF) based model. Specifically, in the global aspect, we employ the PageRank to derive the importance of nodes, so that the more important the node is, the more influence the node is in the network. In the local aspect, we utilize nearness between nodes to obtain the similarities between nodes, so that nodes with larger similarities will have similar community membership. Thereafter, we derive the

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