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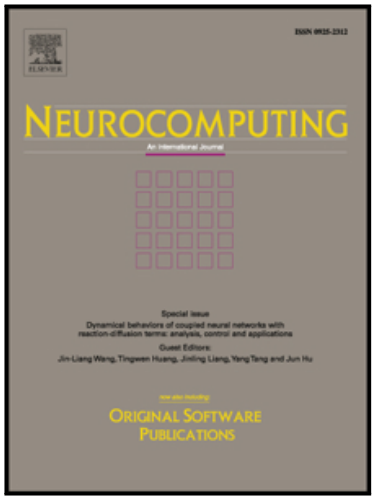

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Learning Node and Edge Embeddings for Signed Networks

Wenzhuo Song[a,b], Shengsheng Wang[a,b,*], Bo Yang[a,b], You Lu[c], Xuehua Zhao[d,b], Xueyan Liu[a,b]

[a]*Department of college of computer science and technology, Jilin University, Changchun, 130012, China*
[b]*Key Laboratory of Symbolic Computation and Knowledge Engineering of Ministry of Education, Jilin University, Changchun, 130012, China*
[c]*Department of Computer Science, Virginia Tech, Blacksburg, VA, 24060, USA*
[d]*School of Digital Media, Shenzhen Institute of Information Technology, Shenzhen, 518172, China*

Abstract

Machine learning tasks for edges and nodes in networks heavily rely on feature engineering which requires expert knowledge and careful effort. Recent years, people become interested in the low dimensional vector representation of nodes and edges. However, existing methods on signed networks only aim to learn the node vectors, resulting in omitting edge information and extra effort to design edge vectors. In this work, we develop a framework for learning both nodes and edge vectors for signed networks. Thus, we can directly use edge vectors to represent the properties of the edges, and thereby improving the performance of link-oriented tasks. Our framework for learning network features is as below. We assume that there is a global mapping between the node and edge vector spaces. This assumption allows us to transform the problem into learning the mapping function and the node vectors. We propose node proximity for signed networks, a definition that is generalized from the second-order node proximity for unsigned networks. It provides a unified objective function that can preserve both the node and edge pattern of the network. Based on this definition, we propose two signed network

*Corresponding author
Email addresses: wzsong17@gmail.com (Wenzhuo Song), wss@jlu.edu.cn (Shengsheng Wang), ybo@jlu.edu.cn (Bo Yang), you.lu@vt.edu (You Lu), lcrlc@sina.com (Xuehua Zhao), dyyzlxy@163.com (Xueyan Liu)