

Statistical Link Label Modeling for Sign Prediction: Smoothing Sparsity by Joining Local and Global Information

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Abstract—One of the major issues in signed networks is to use network structure to predict the missing sign of an edge. In this paper, we introduce a novel probabilistic approach for the sign prediction problem. The main characteristic of the proposed models is their ability to adapt to the sparsity level of an input network. Building a model that has an ability to adapt to the sparsity of the data has not yet been considered in the previous related works. We suggest that there exists a dilemma between local and global structures and attempt to build sparsity adaptive models by resolving this dilemma. To this

the labels of links becomes a crucial problem for exploiting networked information [6]. In networks with multi-type of relations, not only the existence of the link between two nodes is of great importance, but also its label is as well. The problem of inferring labels of relations and in particular sign of a relationship has attracted attention in recent years under the topic: “sign prediction or link classification” [7]. Sign prediction has various applications in various domains. For example, recommender systems can benefit from efficient