

Uncovering Latent Structure in Valued Graphs: A Variational Approach

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As more and more network-structured datasets are available, the statistical analysis of valued graphs has become a common place. Looking for a latent structure is one of the many strategies used to better understand the behavior of a network. Several methods already exist for the binary case.

We present a model-based strategy to uncover groups of nodes in valued graphs. This framework can be used for a wide span of parametric random graphs models. Variational tools allow us to achieve approximate maximum likelihood estimation of the parameters of these models. We provide a simulation study showing that our estimation method performs well over a broad range of situations. We analyse several valued biological and ecological networks to detect underlying structures.

Keywords: Latent structure, Mixture model, Random graph, Valued graph, Variational method