Consistent Community Detection in Multi-layer Network Data Review

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three-sentence summary

The paper proposes a tensor stochastic block models to detect a general community structure on 2-D space across layers of network data. Theorem for the least square estimation shows that multi-layer network provides richer information for consistent community detection than single-layer detection. Experiments with label-switching algorithm emphasizes the advantages of multi-layer study in real life problems.

Highlight

1. The tensor model here can find a consistent community from the incomplete or weak information in each layer, which is of importance in real life problems such as brain development in different age, social connection detection through various media.

2. The key technical contribution on tensor concentration result.

Question

1. Since several layers can share the same adjacency matrix B, adding another membership matrix on the first mode may be a better way when m goes infinity faster than cn?

2. Why the paper use ρB^0 to control the sparsity rather than $B^0 - \rho$?