Multiway Clustering via Tensor Block Models
Review

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three-sentence summary

The paper proposes a tensor block model(TBM) to identify the multiway blocks with constant means from a noise tensor and further identify the important blocks by adding sparse regularization. A least-square based estimate is developed with better statistical performance on estimate convergence rate (MSE) and partition consistency (Misclassification rate). Simulations and real data analysis implemented by an alternating algorithm imply the outperformance of TBM over traditional tensor decomposition methods.

Highlight

1. TBM performs estimation and clustering just in one shot, thanks to the membership matrices.

2. TBM handles various data kinds with sub-Gaussian noise in model: $y_{i_1,\ldots,i_n} = c_{r_1,\ldots,r_n} + \epsilon_{i_1,\ldots i_n}$, including Gaussian data, Bernoulli data and hybrid observations.

Question

1. Why we use least square based estimator rather than likelihood based estimator? What's the intuition?

2. Can this model do well with count data or binomial data?