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Subspace Clustering via Thresholding and Spectral Clustering

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(Submitted on 15 Mar 2013)

We consider the problem of clustering a set of high-dimensional data points into sets of low-dimensional linear subspaces. The number of subspaces, their dimensions, and their orientations are unknown. We propose a simple and low-complexity clustering algorithm based on thresholding the correlations between the data points followed by spectral clustering. A probabilistic performance analysis shows that this algorithm succeeds even when the subspaces intersect, and when the dimensions of the subspaces scale (up to a log-factor) linearly in the ambient dimension. Moreover, we prove that the algorithm also succeeds for data points that are subject to erasures with the number of erasures scaling (up to a log-factor) linearly in the ambient dimension. Finally, we propose a simple scheme that provably detects outliers.

Submission history

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