

# Robust Inherent Spectral Clustering

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Clustering analysis can uncover low-dimensional structure for data points in high dimensions. Among numerous clustering approaches, spectral clustering is perhaps the most popular one, but it has to call another clustering algorithm in the reduce space to reveal the clusters explicitly. The two-stage fashion is greedy and incurs some issues in the later stage, such as the choice of metric and the tuning of cluster number. We formulate the clustering problem in a novel supervised framework and come up with inherent clustering by use of some joint regularization. Moreover, noticing that the concepts of clustering points and anomalies are closely connected, we robustify it to accommodate and identify rogues points. The proposed robust inherent spectral clustering (RISC) can detect multiple dominant clusters robustly and concurrently with no need of matrix deflation. A new parameter tuning criterion is developed from the predictive learning perspective. Some examples in network community detection are demonstrated.