Accepted Manuscript

Structured Sparse Subspace Clustering with Grouping-Effect-Within-Cluster

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PII: S0031-3203(18)30194-8
DOI: 10.1016/j.patcog.2018.05.020
Reference: PR 6564

To appear in: *Pattern Recognition*

Received date: 12 April 2017
Revised date: 17 February 2018
Accepted date: 20 May 2018

Please cite this article as: Huazhu Chen, Weiwei Wang, Xiangchu Feng, Structured Sparse Subspace Clustering with Grouping-Effect-Within-Cluster, *Pattern Recognition* (2018), doi: 10.1016/j.patcog.2018.05.020

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Highlights

- We define a concept of grouping-effect-within-cluster (GEWC) to group data from the same subspace together. We design a new regularization term coupling the self-representation matrix and the segmentation matrix to enforce GEWC. The new regularization term interactively enforces both to have the expected properties: the segmentation matrix enforces the self-representation coefficient vectors to have large cosine similarity, or GEWC, whenever the data points are drawn from the same subspace and they have the same cluster labels. On the other hand, the self-representation matrix enforces data to have the same cluster labels whenever their self-representation coefficient vectors have large cosine similarity.

- Incorporating the new penalty into the SSSC model, we present a new unified minimization framework for affinity learning and subspace clustering. The new model considers not only structured sparseness but also GEWC.

- Experimental results on several commonly used datasets demonstrate that our method outperforms other state-of-the-art methods in revealing the subspace structure of high-dimensional data.

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