

Online Group-Structured Dictionary Learning

We develop a dictionary learning method which is (i) online, (ii) enables overlapping group structures with (iii) non-convex sparsity-inducing regularization and (iv) handles the partially observable case. Structured sparsity and the related group norms have recently gained widespread attention in group-sparsity regularized problems in the case when the dictionary is assumed to be known and fixed. However, when the dictionary also needs to be learned, the problem is much more difficult. Only a few methods have been proposed to solve this problem, and they can handle two of these four desirable properties at most. To the best of our knowledge, our proposed method is the first one that possesses all of these properties. We investigate several interesting special cases of our framework, such as the online, structured, sparse non-negative matrix factorization, and demonstrate the efficiency of our algorithm with several numerical experiments.

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