



Exploiting Correlation in Sparse Signal Recovery Problems: Multiple Measurement Vectors, Block Sparsity, and Time-Varying Sparsity

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A trend in compressed sensing (CS) is to exploit structure for improved reconstruction performance. In the basic CS model, exploiting the clustering structure among nonzero elements in the solution vector has drawn much attention, and many algorithms have been proposed. However, few algorithms explicitly consider correlation within a cluster. Meanwhile, in the multiple measurement vector (MMV) model correlation among multiple solution vectors is largely ignored. Although several recently developed algorithms consider the exploitation of the correlation, these algorithms need to know a priori the correlation structure, thus limiting their effectiveness in practical problems. Recently, we developed a sparse Bayesian learning (SBL) algorithm, namely T-SBL, and its variants, which adaptively learn the correlation structure and exploit such correlation information to significantly improve reconstruction performance. Here we establish their connections to other popular algorithms, such as the group Lasso, iterative reweighted ℓ_1 and ℓ_2 algorithms, and algorithms for time-varying sparsity. We also provide strategies to improve these existing algorithms.

Comments: Extended abstract for ICML 2011 Structured Sparsity: Learning and Inference Workshop. Experiment codes can be downloaded from: [this http URL](#)

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