

Recently, finding the low-dimensional structure of high-dimensional data has gained much attention. Given a set of data points sampled from a single subspace or a union of subspaces, the goal is to learn or capture the underlying subspace structure of the data set. In this paper, we propose elastic-net subspace representation, a new subspace representation framework using elastic-net regularization of singular values. Due to the strong convexity enforced by elastic-net, the proposed method is more stable and robust in the presence of heavy corruptions compared with existing lasso-type rank minimization approaches. For discovering a single low-dimensional subspace, we propose a computationally efficient low-rank factorization algorithm, called FactEN, using a property of the nuclear norm and the augmented Lagrangian method. Then, ClustEN is proposed to handle the general case, in which the data samples are drawn from a union of multiple subspaces, for joint subspace clustering and estimation. The proposed algorithms are applied to a number of subspace representation problems to evaluate the robustness and efficiency under various noisy conditions, and experimental results show the benefits of the proposed method compared with existing methods.