Group Sparse Multiview Patch Alignment Framework With View Consistency for Image Classification

Abstract:

No single feature can satisfactorily characterize the semantic concepts of an image. Multiview learning aims to unify different kinds of features to produce a consensual and efficient representation. This paper redefines part optimization in the patch alignment framework (PAF) and develops a group sparse multiview patch alignment framework (GSM-PAF). The new part optimization considers not only the complementary properties of different views, but also view consistency. In particular, view consistency models the correlations between all possible combinations of any two kinds of view. In contrast to conventional dimensionality reduction algorithms that perform feature extraction and feature selection independently, GSM-PAF enjoys joint feature extraction and feature selection by exploiting l_2-norm on the projection matrix to achieve row sparsity, which leads to the simultaneous selection of relevant features and learning transformation, and thus makes the algorithm more discriminative. Experiments on two real-world image data sets demonstrate the effectiveness of GSM-PAF for image classification.