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Abstract: The regularized least square based discriminative projections (RLSDP) for extracting features was recently proposed, which aims to seek discriminant projection directions that maximize the between-class scatter and minimize the within-class compactness. However, in RLSDP, the retrieval samples are reconstructed by the coefficients only associated with the same class, and may have large errors. Moreover, the distances between each sample and other within-class samples characterize the most important within-class compactness information, and are not minimized in RLSDP. To deal with the above two problems, we propose an enhanced regularized least square based discriminative projections (ERLSDP). ERLSDP utilizes all the related coefficients of each sample for reconstruction and explicitly minimizes the distances between all the within-class samples, and thus it has better reconstruction accuracy and more discriminating power than that of RLSDP. Experimental results demonstrate that ERLSDP gets a clear improvement over RLSDP when the training sample size is small.

Keywords: feature extraction; regularized least square; collaborative representation; sparse representation

1. Introduction

Feature extraction, which aims to produce compact and effective low-dimensional feature representations of high-dimensional data, has been extensively studied over the past several decades. Compared with the global based principal component analysis (PCA) [1] and linear discriminant analysis (LDA) [2] approaches, manifold learning methods are more appealing since they can discover the local intrinsic structure of data. Representative manifold

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