NONLINEAR COMMON VECTORS FOR PATTERN CLASSIFICATION (ThuAmOR3)

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Abstract :

The Common Vector (CV) method is a linear method, which allows to discriminate between classes of data sets, such as those arising in image and word recognition. In this paper a variation of this method is introduced for finding the projection vectors of each class as elements of the intersection of the null space of that class' covariance matrix and the range space of the covariance matrix of the pooled data. Then, a novel approach is proposed to apply the method in a nonlinearly mapped higher−dimensional feature space. In this approach, all samples are mapped to a higher−dimensional feature space using a kernel mapping, and then the modified CV method is applied in the transformed space. As a result, each class gives rise to a unique common vector. This approach guarantees a 100% recognition rate for the samples of the training set. Moreover, experiments with several test cases also show that the generalization ability of the proposed method is superior to the kernel−based nonlinear subspace method.

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