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基于Gabor多通道加权优化与稀疏表征的人脸识别方法

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Face Recognition Based on Gabor Multi-channel Weighted Optimization and Sparse Representation

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摘要 稀疏表征理论在模式识别中的应用引起广泛的关注。在用稀疏表征方法研究人脸识别问题中，为了使得表征系数矢量具有更为显著的稀疏性，该文提出一种Gabor稀疏表征分类(Gabor Sparse Representation Classification, GSRC)算法，该算法利用Gabor局部特征构造字典，增强算法对外界环境变化的鲁棒性。GSRC算法对所有的Gabor特征等同对待，通过进一步考虑不同Gabor特征对识别的不同贡献，该文提出了一种加权多通道Gabor稀疏表征分类(WMC-GSRC)算法，该算法通过引入Gabor多通道模型，提取不同通道的Gabor特征分别构造字典和稀疏表征分类器，在决策级执行分类器的加权融合得到识别结果。通过在ORL, AR和FERET人脸库上的实验结果验证了该文算法的有效性。

关键词： 人脸识别 稀疏表征 Gabor局部特征 字典 分类器融合

Abstract： Very recently, the sparse representation theory in pattern recognition arouses widespread concern. In this paper, the sparse representation-based face recognition algorithms are studied. In order to make the representation coefficient vector sparser, a Gabor Sparse Representation Classification (GSRC) algorithm is presented, which uses the Gabor local feature to construct dictionary to enhance the robustness for the external environment changes. GSRC algorithm equally treats all the Gabor features, while in consideration that different Gabor features distinctively contribute to the face recognition task, a Weighted Multi-Channel Gabor Sparse Representation Classification (WMC-GSRC) algorithm is further proposed. By introducing the Gabor multi-channel model, WMC-GSRC algorithm extracts Gabor features in different channels to construct dictionaries and sparse representation classifiers, and obtains the final classification result by performing the weighting fusion of classifiers. Experimental results given in the paper on the ORL, AR and FERET face databases show the feasibility and effectiveness of the proposed methods.

Keywords： Face recognition Sparse representation Gabor local feature Dictionary Classifier fusion

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