

联合Gabor降维特征与奇异值特征的人脸识别

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Face recognition based on Gabor reduction dimensionality features and singular value decomposition features

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摘要

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摘要

针对传统的Gabor特征表征图像的全局特征能力较差的问题,提出一种采用Gabor多方向降维特征与图像的奇异值特征相联合的人脸特征表征方法。该方法在对Gabor滤波器直流分量补偿的基础上优化滤波器尺度伸缩随中心频率而变化的性能,以提取人脸图像的多尺度、多方向特征;对同一尺度不同方向的Gabor特征相加以降低特征维数。同时分别提取整幅图像的奇异值分解(SVD)全局特征以及分块SVD特征,将Gabor局部特征分别与上述SVD特征联合起来表征人脸图像。为提高计算效率,应用人脸采样图像进行了实验。实验结果表明,所提方法更好地保留了图像的局部细节、降低了特征数据的冗余,在识别率和计算率上都较传统Gabor滤波器更具优势,在ORL人脸库上的识别率高达98.21%。

关键词: 人脸识别, Gabor特征, 奇异值, 局部特征, 全局特征

Abstract:

For the disability of traditional Gabor filter bank on poor global feature representation, Gabor reduction dimensionality features are combined with the Singular Value Decomposition(SVD) global features of an image to characterize the facial features. On the basis of compensating the DC component in the Gabor filter, the scale retractable performance of the filter which varies with its center frequency is optimized to extract multi-scale, multi-orientation of face images. The features were added in same scale of different directions to reduce the dimensionality of features. Meanwhile, the SVD features in the whole image and block image were extracted respectively, then local Gabor features and the SVD feature mentioned above were joint to characterize the face image respectively. In order to improve computational efficiency, the face image was sampled to obtain a sample image. Experimental results show that the proposed method maintains image details and reduces the redundancy of feature data better. It shows greater recognition rate and calculation rates than the traditional Gabor filter, and the recognition rate in ORL face database is up to 98.21%.

Key words: face recognition Gabor feature Singular Value Decomposition(SVD) local feature gobal feature

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