

5	0.8967	0.9584	0.9623
6	0.9217	0.9608	0.9782
7	0.9548	0.9696	0.9833
8	0.9762	0.9768	0.9867

表 5 中实验结果表明本文算法针对非限定条件下获取的人脸图像识别有一定优势。当训练样本数达到 8 时, 本文算法识别准确率与文献[6]和文献[11]相比分别增加了 1.08%和 1.01%。该样本库每类样本数为 10, 充分证明本文算法在样本数量较少、图像拍摄环境非限定、姿态发生转换、光强变化明显的条件下有很好的适应性。

不同算法在 LFW 人脸库中达到最优识别效果时特征维数对比如图 7 所示。

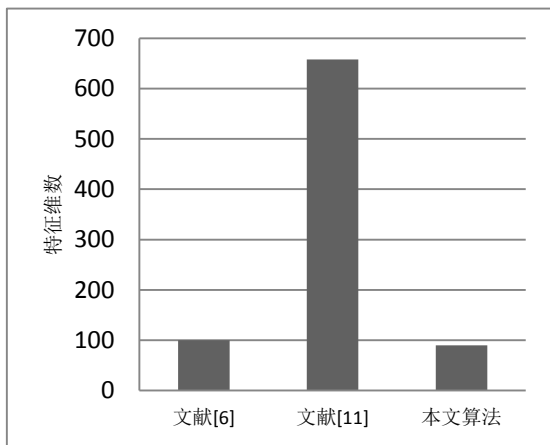


图 7 不同算法降维效果对比

Fig.7 Comparison of dimension reduction effect of different algorithms

从图 7 中可以看出本文算法在 LFW 人脸库中达到最优识别效果时识别性能略高于另两种算法。就降维效果而言, 本文算法与文献[6]相比有所提高, 与文献[11]相比有非常大的提升, 表明本文算法在平衡降维效果与识别性能方面有一定的优势。

4 结 论

提出一种广义并行二维复判别分析的人脸识别方法, 该算法可以有效处理小样本事件, 克服光强变化, 表情变化, 姿态变化等导致识别率不佳的情况, 对非限定条件下获取的人脸图像识别也有较好的鲁棒性。

本文通过将特征向量转化为正交特征向量, 有效改善了二维线性判别分析提取特征不稳定的情况; 分别从水平和垂直方向提取特征, 充分获取了有效的鉴别信息; 特征向量的选取是根据特征值贡献程

度进行动态选择, 使得提取到的特征最具鉴别力; 将两种特征以复数相加的方式融合, 对两种特征均予以保留; 最后再次根据特征值的贡献效果选择最后参与分类的特征, 使得特征维数较其它方法更低。

本文针对人脸图像提取线性特征进行识别分类, 忽略了人脸图像中存在的非线性特征, 今后可就非线性特征提取方面对 GP2DCDA 算法进行扩展; 在时间复杂度方面与其它方法相比没有明显的优势, 今后需进一步研究如何降低时间复杂度的同时增加非线性特征的提取。

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