

基于分块 2DPCA 与 2DLDA 的单训练样本人脸识别

覃 磊^{1,2}, 李德华¹, 周 康²

(1 华中科技大学 自动化学院, 湖北 武汉 430074; 2 武汉轻工大学 数学与计算机学院, 湖北 武汉 430023)

摘要: 二维线性判别分析(2DLDA)在人脸识别已经获得巨大成功,然而用于单训练样本人脸识别问题方法失效,因为每类需要多个样本计算类内散度。对此提出了一种新的基于图像矩阵的分块二维主成分分析+二维线性判别分析(Block 2DPCA+2DLDA)的单训练样本人脸识别算法。首先将图像进行分块,并按其位置将子图像分成多个样本集,在每个样本集上应用 2DPCA 算法,进行第一次识别。其次将第一次识别出的已知类别的测试样本并入原单训练样本集中,原单训练样本集成为多训练样本集。最后在新的训练样本集和测试集上应用 2DLDA 算法作为第二次识别,识别第一次未能识别出的图像。Block 2DPCA+2DLDA 算法在 ORL 人脸数据库上被检测,实验结果表明 Block 2DPCA+2DLDA 识别结果优于 PCA, 2DPCA 等算法。

关键词: 单训练样本; 人脸识别; 二维主成分分析(2DPCA); 二维线性判别分析(2DLDA)

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Single Training Sample Face Recognition Based on Block 2DPCA and 2DLDA

QIN Lei^{1,2}, LI De-hua¹, ZHOU Kang²

(1 School of Automation, Huazhong University of Science and Technology, Wuhan 430074, China;

2 School of Mathematics and Computer, Wuhan Polytechnic University, Wuhan 430023, China)

Abstract: Two-dimensional linear discriminant analysis (2DLDA) has achieved great success in face recognition, however, it fails to work for single training sample face recognition, since it need more than one sample per person to estimate the within-class scatter. This paper proposes a novel single training sample face recognition algorithm based on Block 2DPCA+2DLDA. At first, the original images are divided into some sub-images, according to the locations of the sub-images they are divided into multiple sample sets, 2DPCA is applied on each sample set for the first recognition. The test samples which have been identified after the first recognition are added to the original training sample set as the samples of known class labels, and the original single training sample set will become a multiple training samples set. Finally 2DLDA is used in the new training sample set and test set for the second recognition, which is to identify the images that are not recognized on the first time. The Block 2DPCA+2DLDA algorithm is tested on the ORL face database, the experiment results show that the algorithm is better than PCA and 2DPCA algorithms etc.

Key words: Single training sample; face recognition; 2DPCA; 2DLDA

作者简介:

覃 磊 男, (1979-), 博士研究生, 讲师. 研究方向为模式识别与智能计算. E-mail: 53039943@qq.com

李德华 男, (1946-), 教授, 博士生导师. 研究方向为模式识别与人工智能.

周 康 男, (1965-), 博士, 教授. 研究方向为模式识别.

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