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## 论文

### 基于二维判别典型相关分析的人脸识别算法

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摘要:

本文提出了一种新的基于典型相关分析的人脸识别算法, 叫做二维判别典型相关分析(2D-DCCA)。该算法将2阶张量的概念引入了典型相关分析方法中。传统的典型相关分析方法中, 样本是用高维的向量表示的, 不仅计算量大, 而且常常出现内存不足, 协方差矩阵有奇异性等问题。本文算法不仅将样本的向量表达改为矩阵表达, 并且充分利用样本的类内和类间信息来优化目标函数, 从而使得该算法获得了诸多优点: 首先, 使得学习出的子空间维数降低, 从而计算量和计算时间都大大减少; 其次, 有效地避免了协方差矩阵的奇异性问题; 最后, 由于目标函数的优化利用了样本的类信息, 从而更有利于最邻近分类器进行判别。实验表明, 在人脸角度变化时, 该方法具有稳定的识别性能。

关键词: 典型相关分析 2阶张量 判别分析 特征提取 人脸识别

## Two-Dimensional Discriminant Canonical Correlation Analysis for Face Recognition

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Abstract:

We present a face recognition method called two-dimensional discriminant canonical correlation analysis (2D-DCCA) which is based on Canonical Correlation Analysis (CCA). The main idea is that the concept of two order tensor is combined with CCA in this paper. A sample is usually represented as a vector in the conventional CCA method which consumes lots of memory and has the singular problem. The proposed method not only makes full use of the information of within-class and between-class, but also the samples here are represented as the matrices. Hence the proposed method has these advantages: low dimensional subspace, efficient computation and the singular problem is totally avoided. The objective functions are optimized by using the information of within-class and between-class, so the accuracy of face recognition improves in the nearest neighborhood classifier. The result of the following experiments shows that the proposed method is robust when the pose of the face varies.

Keywords: Canonical Correlation Analysis (CCA) two order tensor discriminant analysis feature extraction Face recognition

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- Article by Huang, L. K.
- Article by Pi, Y. M.

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