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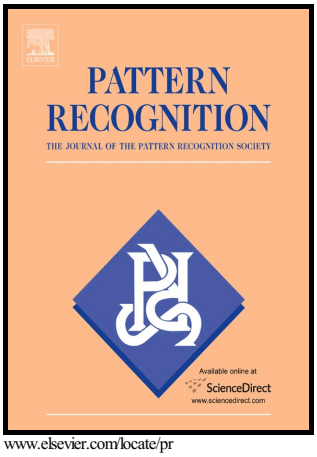

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Adaptive Maximum Margin Analysis for Image Recognition

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Abstract: Most existing discriminant manifold learning methods aim to maximize the margin among nearby data, which is determined in the *high-dimensional original* space. As such, they do not necessarily best maximize the margin between different classes in the *low-dimensional* space, which is a critically important property for image classification. To handle this problem, we propose an adaptive maximum margin analysis (AMMA) for feature extraction. AMMA aims to seek a projection matrix that best maximize the margin, which is calculated in the low-dimensional space. It uses sparse representation to adaptively construct the intrinsic and penalty graphs. Finally, an iterative algorithm is developed to solve the projection matrix. Extensive experimental results on several image databases illustrate the effectiveness of the proposed approach.

Index Terms--- Maximum margin, dimensionality reduction, sparse representation, image recognition

1. INTRODUCTION

In reality, the high-dimensional images may not be uniformly distributed in the whole ambient space and reside on a lower dimensional sub-manifold which is embedded in the high-dimensional ambient space [1-4]. Thus, it is important to consider how to obtain a compact and effective low-dimensional representation, i.e.,