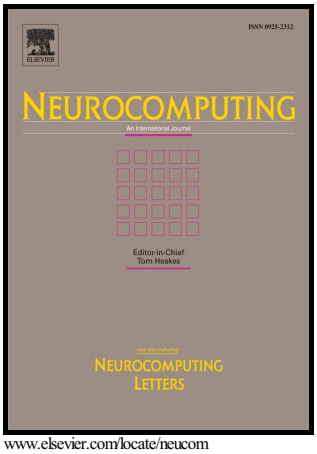

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PII: S0925-2312(15)01956-6
DOI: http://dx.doi.org/10.1016/j.neucom.2015.12.020
Reference: NEUCOM16533

To appear in: *Neurocomputing*

Received date: 17 January 2015
Revised date: 14 September 2015
Accepted date: 3 December 2015

Cite this article as: Guangsheng Xia, Hui Yan and Jian Yang, Sparse Preserving Feature Weights Learning, *Neurocomputing* http://dx.doi.org/10.1016/j.neucom.2015.12.020

Sparse Preserving Feature Weights Learning

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Abstract

In this paper, we propose a novel unsupervised feature selection algorithm, named sparse preserving feature weights learning (SPFW), which is based on the recent local data representation theory, sparse representation. SPFW differs from traditional feature selection algorithms in two aspects: (1) SPFW is designed on the locality measurement criterion with sparse reconstruction residual minimization. It adaptively determines the locality based on sparse representation, instead of fixing the k-nearest neighbors in the original feature space. (2) SPFW selects the most discriminative feature subset from the whole feature set in batch mode, instead of selecting features individually. To optimize the proposed formulation, we propose an efficient iterative algorithm, where each iteration reduces to a subproblem which can be solved with some off-the-shelf toolboxes. We conduct experiments on two face datasets to evaluate the performance of feature selection in terms of classification and clustering, which demonstrate the effectiveness of the proposed algorithm.

Keywords: Joint feature selection, Sparse representation, Feature weights learning

1. Introduction

Data are often represented as high-dimensional feature vectors in many applications, such as text processing [1], gene expression analysis [2], and face recognition [3]. However, features are often correlated or redundant to each other, and they may

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