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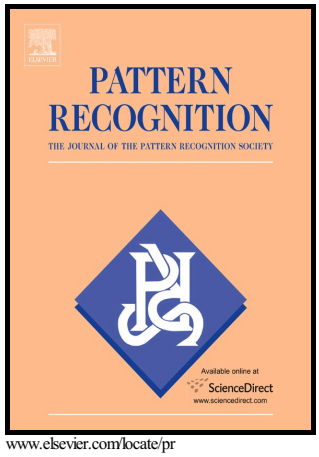

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PII: S0031-3203(16)30360-0
DOI: http://dx.doi.org/10.1016/j.patcog.2016.11.010
Reference: PR5953

To appear in: *Pattern Recognition*

Received date: 20 May 2016
Revised date: 24 August 2016
Accepted date: 13 November 2016

Cite this article as: Bac Nguyen, Carlos Morell and Bernard De Baets Supervised distance metric learning through maximization of the Jeffrey divergence, *Pattern Recognition,* http://dx.doi.org/10.1016/j.patcog.2016.11.010

Supervised distance metric learning through maximization of the Jeffrey divergence

Bac Nguyen[a,*], Carlos Morell[b], Bernard De Baets[a]

[a] *KERMIT, Department of Mathematical Modelling, Statistics and Bioinformatics, Ghent University, Coupure links 653, 9000 Ghent, Belgium.*
[b] *Computer Science Department, Universidad Central "Marta Abreu" de Las Villas, Santa Clara, Cuba.*

Abstract

Over the past decades, distance metric learning has attracted a lot of interest in machine learning and related fields. In this work, we propose an optimization framework for distance metric learning via linear transformations by maximizing the Jeffrey divergence between two multivariate Gaussian distributions derived from local pairwise constraints. In our method, the distance metric is trained on positive and negative difference spaces, which are built from the neighborhood of each training instance, so that the local discriminative information is preserved. We show how to solve this problem with a closed-form solution rather than using tedious optimization procedures. The solution is easy to implement, and tractable for large-scale problems. Experimental results are presented for both a linear and a kernelized version of the proposed method for k-nearest neighbors classification. We obtain classification accuracies superior to the state-of-the-art distance metric learning methods in several cases while being competitive in others.

Keywords: Distance metric learning, Nearest neighbor, Linear transformation, Jeffrey divergence.

*Corresponding author
Email addresses: bac.nguyencong@ugent.be (Bac Nguyen), cmorellp@uclv.edu.cu (Carlos Morell), bernard.debaets@ugent.be (Bernard De Baets)