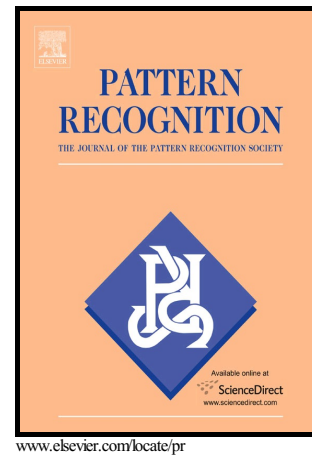


Author's Accepted Manuscript

Efficient Classification with Sparsity Augmented Collaborative Representation

Naveed Akhtar, Faisal Shafiat, Ajmal Mian



PII: S0031-3203(16)30428-9
DOI: <http://dx.doi.org/10.1016/j.patcog.2016.12.017>
Reference: PR5989

To appear in: *Pattern Recognition*

Received date: 24 May 2016
Revised date: 14 December 2016
Accepted date: 15 December 2016

Cite this article as: Naveed Akhtar, Faisal Shafiat and Ajmal Mian, Efficient Classification with Sparsity Augmented Collaborative Representation, *Pattern Recognition*, <http://dx.doi.org/10.1016/j.patcog.2016.12.017>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and a review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Efficient Classification with Sparsity Augmented Collaborative Representation

Naveed Akhtar^{a,*}, Faisal Shafiat^b, Ajmal Mian^a

^a*School of Computer Science and Software Engineering, The University of Western Australia, 35 Stirling Highway, Crawley, 6009 WA, Australia.*

^b*School of Computer Science and Electrical Engineering, National University of Sciences and Technology, H-12 Islamabad, Pakistan.*

Abstract

Many classification approaches first represent a test sample using the training samples of all the classes. This collaborative representation is then used to label the test sample. It is a common belief that sparseness of the representation is the key to success for this classification scheme. However, more recently, it has been claimed that it is the collaboration and not the sparseness that makes the scheme effective. This claim is attractive as it allows to relinquish the computationally expensive sparsity constraint over the representation. In this paper, we first extend the analysis supporting this claim and then show that sparseness explicitly contributes to improved classification, hence it should not be completely ignored for computational gains. Inspired by this result, we augment a dense collaborative representation with a sparse representation and propose an efficient classification method that capitalizes on the resulting representation. The augmented representation and the classification method work together meticulously to achieve higher accuracy and lower computational time compared to state-of-the-art collaborative representation based classification approaches. Experiments on benchmark face, object, action and scene databases show the efficacy of our approach.

Keywords: Multi-class classification, Sparse representation, Collaborative

*Corresponding author

Email address: naveed.akhtar@research.uwa.edu.au (Naveed Akhtar)

Download English Version:

<https://daneshyari.com/en/article/4969650>

Download Persian Version:

<https://daneshyari.com/article/4969650>

[Daneshyari.com](https://daneshyari.com)