

# Author's Accepted Manuscript

unsupervised feature selection via diversity-induced self-representation

Yanbei Liu, Kaihua Liu, Changqing Zhang, Jing Wang, Xiao Wang



PII: S0925-2312(16)31071-2  
DOI: <http://dx.doi.org/10.1016/j.neucom.2016.09.043>  
Reference: NEUCOM17572

To appear in: *Neurocomputing*

Received date: 5 May 2016  
Revised date: 23 July 2016  
Accepted date: 19 September 2016

Cite this article as: Yanbei Liu, Kaihua Liu, Changqing Zhang, Jing Wang and Xiao Wang, unsupervised feature selection via diversity-induced self representation, *Neurocomputing* <http://dx.doi.org/10.1016/j.neucom.2016.09.043>

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 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.

# Unsupervised Feature Selection via Diversity-induced Self-representation

Yanbei Liu<sup>a</sup>, Kaihua Liu<sup>a</sup>, Changqing Zhang<sup>b</sup>, Jing Wang<sup>c</sup>, Xiao Wang<sup>d,\*</sup>

<sup>a</sup>*School of Electronic Information Engineering, Tianjin University, P. R. China. E-mail: liuyanbei@tju.edu.cn, liukaihua@tju.edu.cn*

<sup>b</sup>*School of Computer and Science Technology, Tianjin University, P. R. China. E-mail: zhangchangqing@tju.edu.cn*

<sup>c</sup>*Faculty of Science and Technology, Bournemouth University, United Kingdom. E-mail: jwang@bournemouth.ac.uk*

<sup>d</sup>*Department of Computer Science and Technology, Tsinghua University, P. R. China. E-mail: wangxiao\_cv@163.com*

---

## Abstract

Feature selection is to select a subset of relevant features from the original feature set. In practical applications, regarding the unavailability of an amount of the labels is still a challenging problem. To overcome this problem, unsupervised feature selection algorithms have been developed and achieve promising performance. However, most existing approaches consider only the representativeness of features, but the diversity of features which may lead to the high redundancy and the losses of valuable features are ignored. In this paper, we propose a Diversity-induced Self-representation (DISR) based unsupervised feature selection method to effectively select the features with both representativeness and diversity. Specifically, based on the inherent self-representation property of features, the most representative features can be selected. Meanwhile, to preserve the diversity of selected features and reduce the redundancy of the original features as soon as possible, we introduce a novel diversity term, which adjusts the weights of selected features by incorporating the similarities between features. We then present an efficient algorithm to solve the optimization problem by using the inexact Augmented Lagrange Method (ALM). Finally, both clustering and classification tasks are used to evaluate the proposed method. Empirical results on the synthetic dataset and nine real-world datasets demonstrate the superiority

---

\*Corresponding author: Tel.: +86-182-2221-8207.  
Email address: wangxiao\_cv@163.com (Xiao Wang)

Download English Version:

<https://daneshyari.com/en/article/4948245>

Download Persian Version:

<https://daneshyari.com/article/4948245>

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