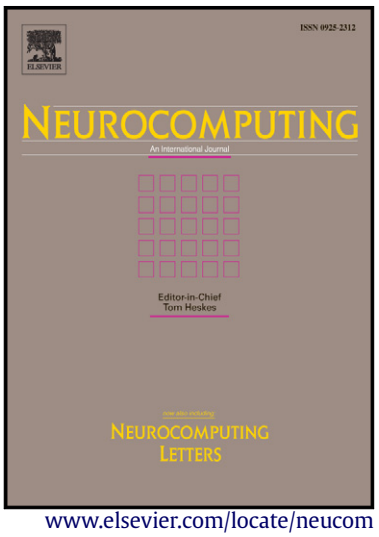
Author's Accepted Manuscript



www.elsevier.com/locate/neucom

An Efficient Concept Detection System Via Sparse Ensemble Learning

Sheng Tang, Zuo-Xin Xu, Yong-Dong Zhang, Hao-Jie Li, Yan-Tao Zheng, Jin-Tao Li

PII: S0925-2312(15)00675-X
DOI: http://dx.doi.org/10.1016/j.neucom.2014.09.100
Reference: NEUCOM15540

To appear in: *Neurocomputing*

Received date: 1 May 2014
Revised date: 24 September 2014
Accepted date: 30 September 2014

Cite this article as: Sheng Tang, Zuo-Xin Xu, Yong-Dong Zhang, Hao-Jie Li, Yan-Tao Zheng, Jin-Tao Li, An Efficient Concept Detection System Via Sparse Ensemble Learning, *Neurocomputing*, http://dx.doi.org/10.1016/j.neucom.2014.09.100

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.

ACCEPTED MANUSCRIPT

An Efficient Concept Detection System Via Sparse Ensemble Learning☆

Sheng Tang[a], Zuo-Xin Xu[a], Yong-Dong Zhang[a], Hao-Jie Li[b], Yan-Tao Zheng[c], Jin-Tao Li[a]

[a]*Institute of Computing Technology, Chinese Academy of Sciences, Beijing, China, 100190*
[b]*School of Software, Dalian University of Technology, Liaoning, China, 116620*
[c]*Institute for Infocomm Research, A*STAR, Singapore, 138632*

Abstract

In this paper, we present an efficient concept detection system based on a novel bag of words extraction method and sparse ensemble learning. The presented system can efficiently build the concept detectors upon large scale image dataset, and achieve real-time concept detection on unseen images with the state-of-the-arts accuracy. To do so, we first develop an efficient bag of visual words (BoW) construction method based on sparse non-negative matrix factorization (NMF) and GPU enabled SIFT feature extraction. We then develop a sparse ensemble learning method to build the detection model, which drastically reduces learning time in order of magnitude over traditional methods like Support Vector Machine. To overcome the difficulty of manual annotation of training dataset, we construct a large training set with both pseudo relevance feedback of negative samples and interactive feedback of positive samples. Experiments on TRECVID 2012 dataset and MIRFlickr-1M dataset show both efficiency and effectiveness of our system.

Keywords: Ensemble learning, visual concept detection, Bag of visual words, Sparse coding, Pseudo relevance feedback

☆This work was supported in part by National Nature Science Foundation of China (61173054) and National High Technology and Research Development Program of China (863 Program, 2014AA015202). Please refer to our website for demo video and dataset: http://mcg.ict.ac.cn/mcg-sel.html.

Email addresses: ts@ict.ac.cn (Sheng Tang), xuzuoxin@ict.ac.cn (Zuo-Xin Xu), zhyd@ict.ac.cn (Yong-Dong Zhang), hjli@dlut.edu.cn (Hao-Jie Li), yantaozheng@gmail.com (Yan-Tao Zheng), jtli@ict.ac.cn (Jin-Tao Li)

Accepted manuscript

Download English Version:

https://daneshyari.com/en/article/6865549

Download Persian Version:

https://daneshyari.com/article/6865549

Daneshyari.com