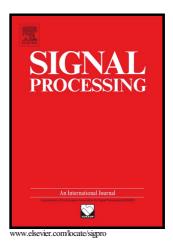
Author's Accepted Manuscript

Convolutional Deep Stacking Networks for Distributed Compressive Sensing

Hamid Palangi, Rabab Ward, Li Deng



 PII:
 S0165-1684(16)30157-8

 DOI:
 http://dx.doi.org/10.1016/j.sigpro.2016.07.006

 Reference:
 SIGPRO6198

To appear in: Signal Processing

Received date: 14 December 2015 Revised date: 18 May 2016 Accepted date: 5 July 2016

Cite this article as: Hamid Palangi, Rabab Ward and Li Deng, Convolutiona Deep Stacking Networks for Distributed Compressive Sensing, *Signa Processing*, http://dx.doi.org/10.1016/j.sigpro.2016.07.006

This is a PDF file of an unedited manuscript that has been accepted fo publication. As a service to our customers we are providing this early version o 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

Convolutional Deep Stacking Networks for Distributed Compressive Sensing

Hamid Palangi^{a,*}, Rabab Ward^a, Li Deng^b

^aDepartment of Electrical and Computer Engineering, University of British Columbia, Vancouver, BC, V6T 1Z4 Canada ^bMicrosoft Research, Redmond, WA 98052 USA

Abstract

This paper address the reconstruction of sparse vectors in the Multiple Measurement Vectors (MMV) problem in compressive sensing, where the sparse vectors are correlated. This problem has so far been studied using model based and Bayesian methods. In this paper, we propose a deep learning approach that relies on a Convolutional Deep Stacking Network (CDSN) to capture the dependency amongst the different channels. To reconstruct the sparse vectors, we propose a greedy method that exploits the information captured by CDSN. The proposed method encodes the sparse vectors using random measurements (as done usually in compressive sensing). Experiments using a real world image dataset show that the proposed method outperforms the traditional MMV solver, i.e., Simultaneous Orthogonal Matching Pursuit (SOMP), as well as three of the Bayesian methods used for compressive sensing. We also show that the proposed method is almost as fast as greedy methods. The good performance of the proposed method depends on the availability of training data (as is the case in all deep learning methods). In many applications, however, training data is available, e.g., different images of the same class or signals with similar sparsity patterns.

Keywords: Distributed Compressive Sensing, Deep Learning, Deep Stacking

Preprint submitted to Signal Processing

^{*}Corresponding author.

Email addresses: hamidp@ece.ubc.ca (Hamid Palangi), rababw@ece.ubc.ca (Rabab Ward), deng@microsoft.com (Li Deng)

Download English Version:

https://daneshyari.com/en/article/6958046

Download Persian Version:

https://daneshyari.com/article/6958046

Daneshyari.com