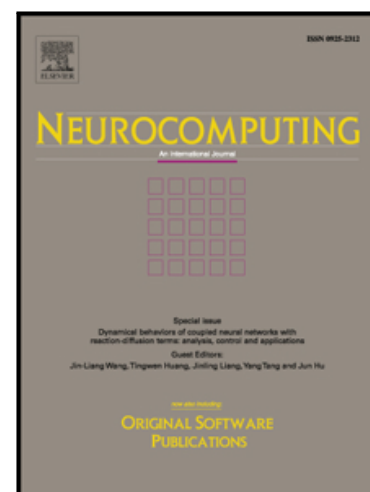


## Accepted Manuscript

Non-Convex Weighted  $\ell_p$  Nuclear Norm based ADMM Framework for Image Restoration

Zhiyuan Zha, Xinggan Zhang, Yu Wu, Qiong Wang, Xin Liu, Lan Tang, Xin Yuan

PII: S0925-2312(18)30658-1  
DOI: [10.1016/j.neucom.2018.05.073](https://doi.org/10.1016/j.neucom.2018.05.073)  
Reference: NEUCOM 19634



To appear in: *Neurocomputing*

Received date: 27 June 2017  
Revised date: 10 April 2018  
Accepted date: 18 May 2018

Please cite this article as: Zhiyuan Zha, Xinggan Zhang, Yu Wu, Qiong Wang, Xin Liu, Lan Tang, Xin Yuan, Non-Convex Weighted  $\ell_p$  Nuclear Norm based ADMM Framework for Image Restoration, *Neurocomputing* (2018), doi: [10.1016/j.neucom.2018.05.073](https://doi.org/10.1016/j.neucom.2018.05.073)

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 proof before it is published in its final 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.

# Non-Convex Weighted $\ell_p$ Nuclear Norm based ADMM Framework for Image Restoration

Zhiyuan Zha<sup>a</sup>, Xinggan Zhang<sup>a</sup>, Yu Wu<sup>a</sup>, Qiong Wang<sup>a</sup>, Xin Liu<sup>c</sup>,  
Lan Tang<sup>a,b</sup>, Xin Yuan<sup>d</sup>

<sup>a</sup> School of Electronic Science and Engineering, Nanjing University, Nanjing 210023, China.

<sup>b</sup> National Mobile Commun. Research Lab., Southeast University, Nanjing 210023, China.

<sup>c</sup> The Center for Machine Vision and Signal Analysis, University of Oulu, 90014, Finland.

<sup>d</sup> Nokia Bell Labs, 600 Mountain Avenue, Murray Hill, NJ, 07974, USA.

---

## Abstract

Inspired by the fact that the matrix formed by nonlocal similar patches in a natural image is of low rank, the nuclear norm minimization (NNM) has been widely used in various image processing studies. Nonetheless, nuclear norm based convex surrogate of the rank function usually over-shrinks the rank components since it treats different components equally, and thus may produce a result far from the optimum. To alleviate the aforementioned limitations of the nuclear norm, in this paper we propose a new method for image restoration via the non-convex weighted  $\ell_p$  nuclear norm minimization (NCW-NNM), which is able to accurately impose the image structural sparsity and self-similarity simultaneously. To make the proposed model tractable and robust, the alternating direction method of multiplier (ADMM) framework is adopted to solve the associated non-convex minimization problem. Experimental results on various image restoration problems, including image deblurring, image inpainting and image compressive sensing (CS) recovery, demonstrate that the proposed method outperforms many current state-of-the-art methods.

**Keywords:** Image restoration, low rank, nuclear norm minimization, Non-convex, weighted  $\ell_p$  nuclear norm, ADMM.

---



---

<sup>\*</sup>Fully documented templates are available in the elsarticle package on CTAN.

Download English Version:

<https://daneshyari.com/en/article/6863634>

Download Persian Version:

<https://daneshyari.com/article/6863634>

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