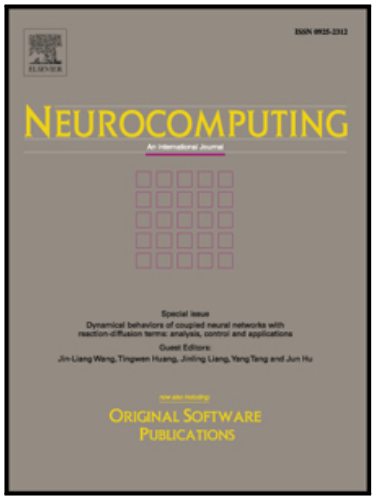
Communicated by Dr. Deng Cheng

Accepted Manuscript



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PII: S0925-2312(18)30658-1
DOI: 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 ℓ_p Nuclear Norm based ADMM Framework for Image Restoration, *Neurocomputing* (2018), doi: 10.1016/j.neucom.2018.05.073

Non-Convex Weighted ℓ_p Nuclear Norm based ADMM Framework for Image Restoration

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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 ℓ_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 ℓ_p nuclear norm, ADMM.

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