

Abstract: An Improved Fast 2DPCA based Nonlocal Means filter

Yuhui Zheng¹, Jianwei Zhang², Wei Tian¹, Yunjie Chen², Lu Liu¹

¹*Jiangsu Engineering Center of Network Monitoring, Nanjing University of Information Science & Technology, Nanjing, 210044*

²*College of Math&Physics, Nanjing University of Information Science & Technology, Nanjing, 210044*

{marsen1031, generalcyj}@yahoo.com.cn; {zhangjw, tw, 002131}@nuist.edu.cn

Abstract

Recently, the Nonlocal means filter are widely studied. Unfortunately, the computational complexity of this method is quite a burden. Therefore, several pre-selection methods have been suggested. In this work, the pre-selection based nonlocal means filters are analyzed, and pointed out that most of them had defects in terms of feature extraction from image patch. In our former work [18], we propose a scheme to more efficiently preselect similar patches, based on the two-dimensional principal component analysis (2DPCA). Although the method can yield good results, the computational complexity remains high. We proposed a simple version of the 2DPCA NL-mean filter [18], which directly employs features extracted by the patch-oriented 2DPCA to compute the weights. Experimental results show that our method can achieve better filtering results in a variety of images, such as weak gradient image, face image and texture image.

Acknowledgements

The authors wish to thank National Natural Science Foundation of China(61173072,61003209), the Academic Program Development of Jiangsu Higher Education Institutions, Natural Science Foundation of the Higher Education Institutions of Jiangsu Province(10KJB520011,10KJB520012), Natural Science Foundation of Jiangsu Province(BK2011824,BK2011825),and the Scientific Research Staring Foundation of Nanjing University of Information Science and Technology for supports.