

Noise level estimation for digital images using local statistics and its applications to noise removal

ABSTRACT

In this paper, an automatic estimation of additive white Gaussian noise technique is proposed. This technique is built according to the local statistics of Gaussian noise. In the field of digital signal processing, estimation of the noise is considered as pivotal process that many signal processing tasks relies on. The main aim of this paper is to design a patch-based estimation technique in order to estimate the noise level in natural images and use it in blind image removal technique. The estimation process is utilized selected patches which is most contaminated sub-pixels in the tested images using principal component analysis (PCA). The performance of the suggested noise level estimation technique is shown its superior to state of the art noise estimation and noise removal algorithms, the proposed algorithm produces the best performance in most cases compared with the investigated techniques in terms of PSNR, IQI and the visual perception.

Keyword: Additive noise; Noise estimation; Principal components analysis; Patch selection; Image denoising