

IMAGE DE-NOISE USING THE 2-D WAVELET

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This paper provides an overview of image de-noising based on wavelet transformation and demonstrates their use on the real structures of knitting. The images of real structure were obtained from microphotographs, which were scanned in Laboratory of image analysis, Textile Faculty, Technical University of Liberec by using the transmission light technique and the special method of composite image scanning. The investigated materials were brushed west knitting fleece from 100% PES.

The result of image de-noising is a new image which is more suitable for further image-processing tasks such as segmentation, feature extraction and object recognition.

WT represents one possible mathematical tool that can be used for de-noising of real images. Each function and threshold has advantages for the recovery of specific image artifacts. Original images were decomposed by wavelet function at first and then threshold value was computed by threshold function, threshold method was chosen and applied to thresholding of wavelet coefficients and image restoration with MSE calculation followed at last. Image wavelet decomposition is proceed by iterative Mallat schema, which means the possibility to modify partial resulting matrixs (alias wavelet coefficients) before the signal reconstruction to eliminate undersirable signal components.

In this paper the following sessions were tested: wavelet functions - haar (HA), discrete Meyer (DMEY2), Daubechies of the 2-nd order (DB2), threshold methods – soft (S), hard (H), threshold functions - Donoho-Johnson (DJ), Birge-Massart (BM), empirical method based on two curves (EM) and mode of level's decomposition – local (L) or global (G) thresholding. For more information see [4,2].

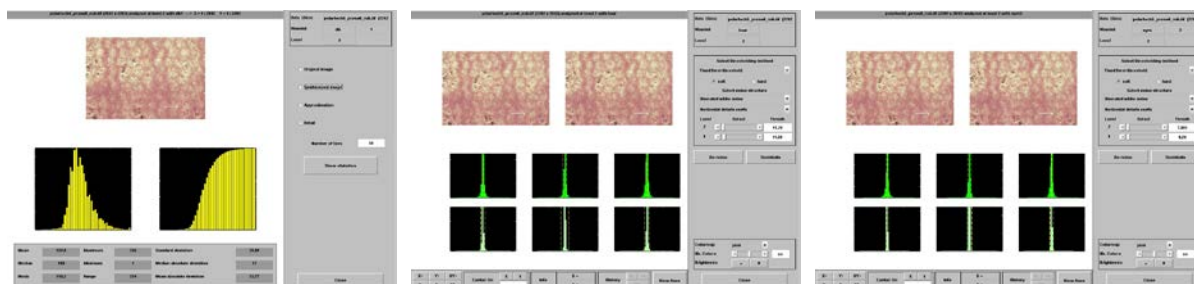


Figure 1: De-noised images

References

- [1] *Matlab reference manual*, <http://www.humusoft.com>
- [2] Lewis A. S., Knowles G. *Image Compression Using the 2-D Wavelet Transform*, IEEE TRANSACTIONS ON IMAGE PROCESSING, VOL. I. NO. 2. APRIL 1992
- [3] Fiala J. *WAVELETOVÁ TRANSFORMACE*, Škoda výzkum, Materials Structure, vol. 6, number 1, (1999)
- [4] Arivazhagan S., L. Ganesan L. *Texture Segmentation Using Wavelet Transform*. *Pattern Recognition Letters*, 24(16):3197–3203, December 2003.