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A WAVELET PACKET BASES APPLICATION IN FUZZY COMPRESSION FRAMEWORK

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Abstract. *In this work we present an optimized hybrid method for the image file compression based on wavelet packets, morphological functions and fuzzy theory. Indeed, we will use wavelets packets to select that subimage which has the highest informational contents, the morphological function to fix the region to compress with similar parameters, and fuzzy sets to compress the image.*
Keywords: Wavelet, Wavelet packets, Fuzzy logic

1. **Introduction.** Recently it has appeared clearly that Nature manifests itself through relevant scale invariant properties and self-similar descriptive parameters. Consequently, also what we capture in a scene, represented by clusters of pixels into an image, generally shows multiscale properties. Nowadays in signal processing, wavelet analysis has shown to have useful properties to describe multi-scale scenarios in different contexts. The target of digital image compression methods is to reduce the bit rate needed to represent, storage and transmit an image while maintaining an acceptable fidelity or image quality. Popular advances in image processing have shown that wavelet transform has opened a new line of search and study in subband image coding; indeed the wavelet transform allows to select the frequencies of an image according to the target to reach [1-3]. In particular, Antonini *et al.* proposed a method for image compression, that uses biorthogonal wavelet to obtain a set of biorthogonal subimages [1]. In this way the input image is decomposed at different scales using a Mallat's pyramidal algorithm architecture [3]. In [2] Averbuch *et al.* describe a similar technique for the image compression that first uses the wavelet transform for the decomposition of the original image into different frequency bands, and then the resulted coefficients are quantized vector by using the LGB (Lindle-Buzo-Gray) algorithm. Karayiannis *et al.* proposed a similar approach for the image compression, in which they combine wavelet decomposition and vector quantization, but in this method the multiresolution codebooks are designed by the LGB algorithm and by various Fuzzy Algorithms for Learning Vector Quantization (FALVQ) [4]. In the last years several researchers have proposed to optimize the algorithm image compression by applying separately the discrete wavelet transform (DWT) to each region in which the input image is divided. In [5,6], the authors suggest a new image compression scheme, which uses the DWT, preserving the texturally important image characteristics, so the image is partitioned into regions of textural significance employing textural descriptors as