

Thesis Title	Image Watermarking by Distribution a Watermark over Subband of Wavelet Packet Transform
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Abstract

This thesis presents an algorithm for digital watermark embedding. By this algorithm, a digital watermarked image can be robust against a high-ratio compression by spreading a watermark image over subbands (except LL subband) of the Wavelet Packet Transform of the original image based on the entropy-based algorithm and by using a secret key to locate the positions for embedding a watermark. To embed the digital watermark, the bits of a watermark image are spread over significant subbands of the best tree by using a secret key to locate the positions into which the watermark bits will be embedded. The order of subbands is prioritized based on its entropy. The proposed scheme allows the watermark to be distributed over the subbands with high entropy; therefore, the watermark will have a better chance of surviving the changes such as JPEG compression. To extract the watermark, the secret key is needed and the reverse procedures of the embedding process are performed; therefore, the security of the watermark is provided. The experiments are performed using 10 different gray-scale benchmark images of size 256×256 pixels and 10 different gray-scale benchmark images of size 512×512 pixels. The results show that the proposed scheme gives a better readability of the watermark measured by the normalized correlation (NC) and give comparable peak signal-to-noise ratio (PSNR) comparing to the previous method.

Keywords : Digital Watermark / Wavelet Packet Transform / Best Tree / Image Compression