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A SVD-based digital watermarking method in wavelet domains.

Summary: To improve the robustness of invisible watermarking, this paper proposes a watermarking method based on singular value decomposition (SVD) and discrete wavelet transform. In this method, after the original cover image is decomposed by a 2-level wavelet transform, the SVD technique is employed to the matrix composed by the second detail coefficients to acquire the embedded positions. On the other hand, the original binary image watermark is scrambled with Arnold transform and then is changed into a one-dimensional bit stream. According to the different combinations of the bit stream and the elements in the singular value matrix, the bit stream of watermark is embedded into the cover image. Experimental results show that the proposed method is superior to some other SVD-based methods when the cover image is suffered from any attack, such as noise-disturbing, filtering, compressing, rotating, rescaling, cropping etc.

Keywords: digital watermarking; singular value decomposition; discrete wavelet transform; robustness