A Multiple Watermarking Scheme for Gray-Level Images using Visual Cryptography and Integer Wavelet Transform

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Abstract. A multiple watermarking scheme for gray-level images by using visual cryptography, modified histogram, integer wavelet transform, and the wavelet tree is presented. The process rearranges the share image and embeds it in the coefficients of the corresponding IWT middle frequencies, and the owner keeps another share image as the key. Under this scheme, all owners will have dual watermark authentication, and through this method, the number of ownerships can be increased. The goal of the proposed scheme for multiple watermarking is to satisfy more requirements of the watermarking characteristics. From security point of view, without the personal key share images, even if the hidden share images were retrieved to obtain the original share image, the watermark information remains unavailable. Applying the proposed four points distinguishing law and bitwise right shift operation, and the share image blocks deciphering rule, the owner's dual watermarks can be extracted to verify the ownership.

Keywords: Digital watermarking, integer wavelet transform, visual cryptography

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