Robust Blind Digital Watermarking in Contourlet Domain

Abstract

This paper presents an invisible robust blind digital watermarking algorithm using adaptive and distributed quantization in contourlet domain for colour images. In the proposed watermarking scheme, the blue plane of the colour image is decomposed into series of multiscale, local and directional sub images using contourlet transform. The low frequency component of the transform is divided into non overlapping blocks, into which Arnold scrambled binary watermark is embedded, with help of adaptive quantization step value of each block. A blind detection algorithm is employed for the watermark recovery process, which does not require the original image. Experimental results show that the proposed algorithm is highly resistant to attacks such as JPEG compression, noising, cropping etc. The proposed method is compared with an odd-even quantization based technique and the results prove that the adaptive quantization based technique gives better robustness, under similar conditions.

References
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**Index Terms**

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**Keywords**
- Blind digital watermarking
- Contourlet transform
- Arnold transform
- Quantization