



Robust reversible watermarking scheme using Slantlet transform matrix

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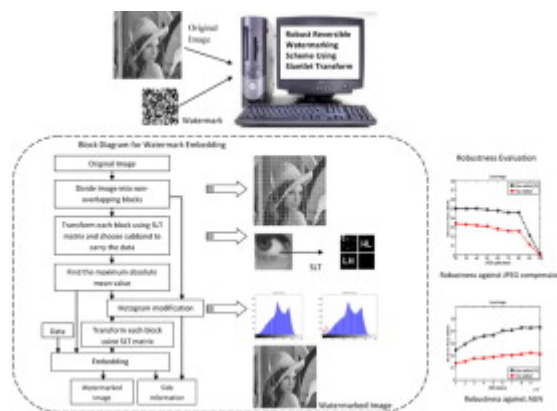
Highlights

- A new robust reversible image watermarking method based on Slantlet transform (SLT) is proposed.
- The host image is divided into non-overlapping blocks before applying SLT and the histogram modification process is applied to prevent the overflow underflow of the pixel values in each block.
- The watermark embedding process depends on modifying the mean values of the SLT coefficients for one subband in each block.
- Experimental tests based on 100 general images and 100 medical images demonstrate the efficiency of the proposed scheme.
- The results prove that the proposed method is completely reversible with improved capacity, robustness and invisibility.

Abstract

The need for a robust reversible watermarking method has recently attracted more attention. This paper presents a novel robust reversible watermarking scheme based on using the Slantlet transform matrix to transform small blocks of the original image and hiding the watermark bits by modifying the mean values of the carrier subbands. The problem of overflow/underflow has been avoided by using histogram modification process. Extensive experimental tests based on 100 general images and 100 medical images demonstrate the efficiency of the proposed scheme. The proposed scheme has robustness against different kinds of attacks and the results prove that it is completely reversible with improved capacity, robustness, and invisibility in comparison with the previous methods.

Graphical abstract



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Keywords

Robust reversible watermarking (RRW); Histogram modification; Slantlet transform (SLT)

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