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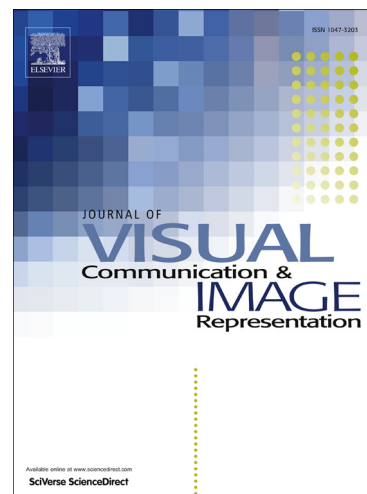
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# Robust blind image watermarking using crisscross inter-block prediction in the DCT domain

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## Abstract

Watermarking has been proposed as a solution to the problem protecting copyrighted multimedia in networked environments. This paper presents a simple but effective blind watermarking scheme capable of satisfying requirements pertaining to imperceptibility as well as robustness, while maintaining a sufficient payload capacity. In the proposed scheme, partly sign-altered mean modulation and mixed modulation are introduced to the crisscross discrete cosine transform (DCT)-based inter-block. Substituting a set of coefficients for a single coefficient enhances robustness against malign attacks. The inclusion of mixed modulation enables control over the parameters required to provide resistance against commonly encountered attacks while maintaining a high peak signal-to-noise ratio. Experiment results demonstrate that the proposed algorithm exceeds the performance of the seven other schemes in providing robust resistance to variety of attacks, particularly those associated with Gaussian noise and speckle noise.

**Keywords:** blind image watermarking, discrete cosine transform, partly sign-altered, mixed modulation, crisscross inter-block prediction

*Figure-1*

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