Evaluation of the sign detector for DCT-domain watermark detection

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Résumé en anglais	Reordering by the rule of decreased absolute amplitudes, the discrete cosine transformation (DCT) coefficients of an image are approximately modeled as dichotomous noise. Based on this assumption, it is interesting to note that the classical multiplicative embedding method can be transformed into an additive embedding rule, which accords with the signal processing problem of detecting a known weak signal in additive non-Gaussian noise. Then, following the generalized Neyman-Pearson lemma, a locally optimum detector, named the sign detector, is introduced to distinguish the correct watermark from the wrong ones. The statistical characteristics of this nonlinear sign detector are analytically investigated in detail. Extensive experimental results demonstrate the robustness of watermark against some common attacks, e.g., JPEG compression, cropping, filtering, additive Gaussian noise, dithering, and also verify the robust performance of the nonlinear sign detector for watermark detection.
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