COMPLEXITY REGULARIZED VIDEO WATERMARKING VIA QUANTIZATION OF PSEUDO−RANDOM SEMI−GLOBAL LINEAR STATISTICS (ThuAmOR8)

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Abstract :

In this paper, we propose a semi−blind video watermarking scheme for the verification problem, where mark embedding is carried out by designing a complexity−adaptive watermark signal via solving a constrained optimization problem. By adding the resulting watermark to the unmarked host, we effectively quantize pseudo−random linear statistics of the host in the wavelet domain using a secret codebook. We introduce a stochastic video model and exploit it during the design. In particular, we use the proposed model to generate a ``complexity map'', which is then employed in solving the underlying optimization problem to ``regularize'' the watermark. Consequently, the resulting watermark is locally adapted to the statistical complexity of the signal at a coefficient level. Regularization is achieved by solving the underlying optimization problem using an iterative algorithm. We experimentally validate the complexity−adaptive structure of the resulting scheme, while maintaining robustness against numerous attacks, such as low bit rate video compression, mild geometric modifications, etc.

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