

Scalable coding-based content adaptation poses serious challenges to traditional watermarking algorithms, which do not consider the scalable coding structure and hence cannot guarantee correct watermark extraction in media consumption chain. In this paper, we propose a novel concept of scalable blind watermarking that ensures more robust watermark extraction at various compression ratios while not effecting the visual quality of host media. The proposed algorithm generates scalable and robust watermarked image code-stream that allows the user to constrain embedding distortion for target content adaptations. The watermarked image code-stream consists of hierarchically nested joint distortion-robustness coding atoms. The code-stream is generated by proposing a new wavelet domain blind watermarking algorithm guided by a quantization based binary tree. The code-stream can be truncated at any distortion-robustness atom to generate the watermarked image with the desired distortion-robustness requirements. A blind extractor is capable of extracting watermark data from the watermarked images. The algorithm is further extended to incorporate a bit-plane discarding-based quantization model used in scalable coding-based content adaptation, e.g., JPEG2000. This improves the robustness against quality scalability of JPEG2000 compression. The simulation results verify the feasibility of the proposed concept, its applications, and its improved robustness against quality scalable content adaptation. Our proposed algorithm also outperforms existing methods showing 35% improvement. In terms of robustness to quality scalable video content adaptation using Motion JPEG2000 and wavelet-based scalable video coding, the proposed method shows major improvement for video watermarking.