



## **AN EFFICIENT BLOCK-BASED FRAGILE WATERMARKING SYSTEM FOR TAMPER LOCALIZATION AND RECOVERY**

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**ABSTRACT**—In this paper we present an efficient block-based fragile watermarking system for tamper localization and recovery of images. We apply the Cyclic Redundancy Checksum (CRC) to authenticate the feature of a block stored in a pair of mapping blocks. The proposed scheme localizes the tampered area irrespective of the gray value, and the detection strategy is designed in such a way to reduce false alarms. It can be applied on grayscale and color images. We conduct malicious attacks using different cropping patterns, sizes, and shapes. Experimental results show that the proposed system outperforms the existing schemes in terms of the recovery rate of modified blocks, the support against the vector quantization attack, the localization of the tampered area, and the reduction of false alarms.

**Key Words:** Digital watermarking, cyclic redundancy checksum, dual recovery, vector quantization, tamper localization