

Image Verification for Digital Rights Management Using Fragile Watermarks Based on a Human Visual Model

Da-Chun Wu^{1,*} and Wen-Hsiang Tsai²

¹Department of Computer and Communication Engineering
National Kaohsiung First University of Science and Technology
Kaohsiung, Taiwan 811, Republic of China
dcwu@ccms.nkfust.edu.tw

²Department of Computer Science
National Chiao Tung University
Hsinchu, Taiwan 300, Republic of China
whtsai@cis.nctu.edu.tw

Received 1 March 2009; Revised 1 April 2009; Accepted 6 April 2009

Abstract. A novel method for embedding perceptually based fragile watermarks in digital images is proposed. The method is designed for the purpose of image verification and tamper proofing for digital rights management applications. A human visual model is employed to guarantee that modifications in images are imperceptible. A set of quantized contrast functions based on a human visual model is constructed first. Then a given image is partitioned into 3×3 subimages. In each subimage, a range of gray levels with the same contrast as that of the central pixel of the subimage is obtained from the quantized contrast functions. One of the values in the range is chosen as a watermark value to replace the gray value of the central pixel of each subimage. This ensures that the change is imperceptible. To achieve higher security, a pseudo random mechanism is employed to generate random keys for use in generating watermark values. The verification process is proceeded with no reference to the original image. The proposed technique provides a visual inspection tool for detecting and localizing any image alteration. Experimental results have been conducted to show the feasibility of the proposed approach.

Keywords: watermarking, image verification, tamper proofing, data embedding, fragile watermark, human visual model.

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*Correspondence Author

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