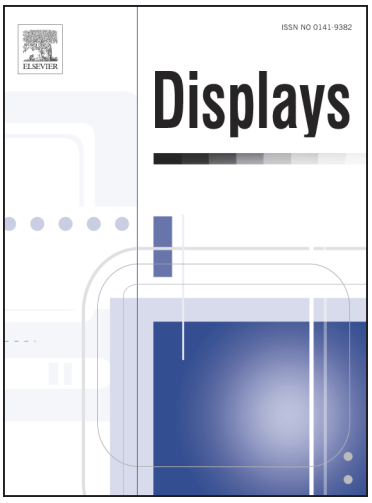

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An Adaptive High-Fidelity Steganographic Scheme Using Edge Detection and Hybrid Hamming Codes

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Abstract

In this paper, we propose a novel image steganography technique with an adaptive embedding scheme that combines the methods of edge detection and hybrid Hamming codes to conceal a secret message in a cover image. We use the Canny edge detection algorithm to identify the sharpness degree of a block because the human visual system is more sensitive to the smooth regions than the sharp regions in the image; therefore, embedding confidential information in the cover image according to the sharpness degree of image regions will provide the consequent stego image with superior visual quality. Inspired by this, the proposed scheme identifies the sharpness degree of each block when embedding a secret message into a cover image, and the volume of data embedded in each block depends on the block sharpness; i.e., the sharper the block is, the more the data embedded into it. To embed a secret message into a cover image, the proposed scheme first uses the sharpest regions of the image and then gradually proceeds to the less sharp regions. Therefore, the proposed scheme can effectively reduce the distortion of the stego image, making it imperceptible. The experimental results show that the proposed scheme achieves better image quality than the previously reported related steganographic techniques.

Keywords: data-hiding, edge detection, Hamming code, matrix embedding