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A NOVEL HYBRID FRACTAL-WAVELET IMAGE CODER

D. M. YADAV AND D. S. BORMANE

Abstract

Fractal coding consists of the representation of image blocks through the contractive transformation coefficients, using the self-similarity concept [1]. It gives excellent visual quality and compression rate of fractal image coding have limited applications due to exhaustive inherent encoding time. A hybrid wavelet–fractal coder proposed by Jin Li and Jay Kuo (WFC) [2] uses the fractal contractive mapping to predict the wavelet coefficients of higher resolution from those of lower resolution and then encode the prediction residue with a bit plane wavelet coder. This procedure of WFC takes more time complexity and gives blocking artifact in decoded image.

We propose in this paper that fast fractal encoding using Fisher's domain classification is applied to the low-pass subband of wavelet transformed image and a modified set partitioning in hierarchical trees (MSPIHT) with Huffman coding, on the remaining coefficients. Furthermore, image details and wavelet progressive transmission characteristics are maintained, no blocking effects from fractal techniques are introduced, and the encoding fidelity problem common in fractal-wavelet hybrid coders is solved. The proposed scheme promotes an average of 94% reduction in encoding-decoding time comparing to the Jacquin style [1] pure accelerated Fractal coding results. The simulations also compare the results to the Amir Said's SPIHT [4], [5] wavelet coding. In both cases, the new scheme improves the subjective quality of pictures for high-medium-low bitrates.

Keywords-Encoding/decoding time; fractals; image coding; wavelet transforms; self-similarity.