Quantization of Wavelet Coefficients for Image Compression

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The use of wavelets and multiresolution analysis is becoming increasingly popular for image compression. In this paper we examine several different approaches to the quantization of wavelet coefficients. A standard approach in subband coding is to use DPCM to encode the lowest band while the higher bands are quantized using a scalar quantizer for each band or a vector quantizer. We implement these schemes using a variety of quantizer including pdf optimized quantizers and recursively indexed scalar quantizers (RISQ) [1]. We then incorporate a threshold operation to prevent the removal of perceptually important information. We show that there is a both subjective and objective improvements in performance when we use the RISQ and the perceptual thresholds. The objective performance measure shows a consistent two to three dB improvement over a wide range of rates. Finally we use a recursively indexed vector quantizer (RIVQ) [2] to encode the wavelet coefficients. The RIVQ can operate at relatively high rates and is therefore particularly suited for quantizing the coefficients in the lowest band.

References


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