Still Image Compression via Partition and Shape-Direction-Adaptive Discrete Wavelet Transform

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Abstract

In this paper we propose a new still gray-level image compression method which is based on image partition and shape-direction-adaptive discrete wavelet transform (SDA-DWT). SDA-DWT is a kind of lifting-based DWTs, and can be performed on arbitrarily shaped region with direction-adaptive functionality. For the proposed method, an image is partitioned into some segments according to texture distribution or a user defined object function. Since SDA-DWT can be applied to arbitrarily shaped segments, we can partition the image as we wish. Then, SDA-DWT is performed on each of the segments which constituting the whole image. The extra costs for the proposed method are the side information needed for partition and the computation for filter direction determination. This method is efficient for image compression especially for orientation-texture-rich or edge-rich images. From the experimental results, the proposed method outperforms a direction-adaptive DWT up to 1.25 dB under 1-bpp (bit / pixel) condition for a typical edge-rich test image.

Keyword：Image compression; Lifting DWT; Shape-direction-adaptive DWT (SDA-DWT); Image