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Hierarchical Prediction and Context Adaptive Coding for Lossless Color Image Compression

Abstract:

This paper presents a new lossless color image compression algorithm, based on the hierarchical prediction and context-adaptive arithmetic coding. For the lossless compression of an RGB image, it is first decorrelated by a reversible color transform and then Y component is encoded by a conventional lossless grayscale image compression method. For encoding the chrominance images, we develop a hierarchical scheme that enables the use of upper, left, and lower pixels for the pixel prediction, whereas the conventional raster scan prediction methods use upper and left pixels. An appropriate context model for the prediction error is also defined and the arithmetic coding is applied to the error signal corresponding to each context. For several sets of images, it is shown that the proposed method further reduces the bit rates compared with JPEG2000 and JPEG-XR.