Study of Image Compression Based on S-tree Techniques

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ABSTRACT

Using spatial data structures for representing binary images has a long history. The S-tree is a spatial data structure for representing binary images. In recent years, the S-tree structure is applied to the image compression, including the lossless compression in medical image and the breadth-first search S-Tree Compression (BFS-STC) in nature images. In this thesis, a modified STC-based image representation is presented for the image compression. The original image is first partitioned into N×N (typically, 16×16 or 32×32) non-overlapping subimages of pixels. The gradient and the edge direction of the subimage are computed by the Sobel masks. The gradient table of edge direction is constructed. The subimage is partitioned into a set of homogeneous blocks according to the binary tree decomposition rule. At each decomposition step, divide the sub-image into two equal parts, in y- and x-axes alternately. Then the mean value of each homogeneous block is computed. According to the path of the depth first search (DFS), the S-tree for subimage is constructed. The S-tree representation consists of three tables, the direction of edge table, the linear-tree table and the color table which are used to represent the partitioned image corresponding to the gray image. Experimental results show that the schemes of this thesis had better performance of the reconstructed image quality than the BFS-STC in the same compression ratio.

Keywords : Image compression ; S-tree ; Edge detection

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