Abstract

In this report, a color video compression algorithm based-on the fractal dimension of differences relative to a reference frame in an image sequence is proposed. The each original frame in image sequence is RGB model, and the three vectors are highly correlated, directly process is difficult. The RGB model of the image sequence is converted to YCbCr model. In fact, the Y component of the YCbCr system provides all the video information required by a monochrome television set. The decomposition of the scene into rectangles with uniform motion in each of the three vectors Y, Cb, and Cr are determined by the fractal dimension of the frame difference, rather than the magnitude of the frame difference itself, inside a macroblock. This novel three-dimensional spatio-temporal splitting of the image sequence exploits the intraframe as well as interframe redundancy for efficient encoding. Each frame within a macroblock is partitioned according to each mask obtained. Only three masks are required for the entire macroblock in our scheme as opposed to the general block matched algorithm that one segmentation topology is needed for each frame to represent the moving information. The performance of this novel approach has been tested on image sequences with different motion dynamics and noise contamination. The average bit rate obtained is compared with that of the MPEG standard at approximately the same PSNR. The results show a consistently much lower bit rate than that of the MPEG for all image sequences tested.