Abstract

The set partitioning embedded block (SPECK) image compression algorithm has excellent performance, low computational complexity, and produces a rate scalable compressed bitstream that can be decoded efficiently at multiple bit-rates. Unfortunately, it consumes a huge amount of computer memory due to employing lists that store the coordinates of the image pixels and the coordinates of the sets that are generated during the coding process. In addition, it has complex memory management due to using an array of random access linked lists to store these sets according to their sizes. In this paper, we propose two algorithms that are based on SPECK. The main contribution of the first algorithm is that, as compared to SPECK, the amount of the algorithm’s usable memory is reduced to about 75% and at the same time its processing speed is increased and its rate distortion efficiency is preserved as will be demonstrated. The second algorithm has higher processing speed but has slightly lower rate distortion performance than the first algorithm.

Index Terms

Computer Science          Algorithms

Keywords

DWT, Embedded Coding, Low Memory Scalable Image Compression, Set Partitioning algorithms, SPECK, SPIHT, Wavelet-based Image Compression.