A Memory Efficient and Faster Modification of Set Partitioning In Hierarchical Trees (SPIHT) Algorithm

Volume 65 - Number 10
Year of Publication: 2013

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10.5120/10957-5923

Abstract

The introduction of the zero-tree wavelet image coding technique has leaded to the development of many new and powerful coding algorithms based on its theory. Because of simplicity and coding efficiency, Said and Pearlman’s Set Partitioning In Hierarchical Trees (SPIHT) algorithm is treated as one of the most significant among these algorithms. However the high memory requirement and time-consuming computation of its three linked lists are its major drawbacks for hardware implementation. Moreover, in the presence of noise it’s extremely sensitive to sign bit error. An error in sign bit of a coefficient causes significant reduction to image quality. In this paper a modification of SPIHT (LMFS) for low memory implementation is proposed which replaces the three linked lists of SPIHT with a state map saving memory space and computation time. A sign map is also introduced to deal with sign bit errors. Experimental results show that under the same condition, LMFS maintains the quality of reconstructed image almost same as SPIHT and is suitable for real time and low memory implementation.
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References


Index Terms

Computer Science     Image Processing

Keywords

SPIHT  LMFS  Low Memory implementation  Reduced CPU cycle