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论文

基于H.264的子带DCT快速算法

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摘要

DCT快速算法是H.264编码的关键问题之一。该文根据H.264中4×4块残差系数的分布特征及DCT系数的能量分布特性，提出一种基于DCT系数子带划分的子带DCT快速算法。该算法在DCT和量化前预判出为零的DCT系数，节省了这些系数的DCT和量化计算开销，提高编码效率。该文提出了划分DCT系数子带的判断标准，预判出子带中量化后为零的DCT系数后，仅计算非零的DCT系数，相应地也减少量化(Q)，反DCT(IDCT)，反量化(IQ)的计算。实验结果表明，该文算法在保持图像质量和码率的同时，极大地节省了DCT， Q，IQ，IDCT的计算量，提高了H.264的编码效率。

关键词 子带离散余弦变换 Zigzag扫描 H.264 快速算法

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Abstract

Fast DCT (Discrete Cosine Transform) is one of the key issues in H.264, according to the properties of DCT coefficients' energy distribution and the characteristics of "zigzag scan", one fast DCT algorithm is proposed based on divided subbands. In the algorithm, DCT coefficients of the prediction residue (Zero Quantized DCT coefficients, ZQDCT) are set zero predictably before implementing DCT and quantization (Q), and then the redundant computations are deduced greatly. One adaptive scheme is also presented with multiple thresholds to divide the subbands. By this scheme, only the DCT coefficients without ZQDCT will be computed. The experimental results show that the proposed algorithm outperform other approaches in literature, and achieve the best performance in reducing computations in the case of the same picture quality and the same compression ratio by the traditional algorithms in H.264 .

Key words Subband DCT Zigzag scan H.264 Fast algorithm

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