

应用

基于梯度方向算子的H.264帧内模式选择算法

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摘要:

提出梯度方向算子的概念, 基于该算子提出了一种H.264帧内模式快速选择算法。本文首先应用梯度方向算子计算编码宏块中各4×4亮度子块的纹理特征和灰度起伏特征, 根据这两种特征参量削减4×4帧内候选预测模式。通过统计宏块中各子块的4×4候选预测模式信息, 结合梯度方向强度门限判别法削减宏块的16×16候选预测模式, 通过率失真优化算法计算得到最优亮度预测模式。进一步根据亮度宏块和色度宏块的对应关系, 在亮度候选预测模式的基础上对色度宏块候选预测模式进行削减, 最后计算得到最优色度预测模式。该算法削减了50%以上的帧内预测模式, 减少了帧内预测模式选择的运算量, 实验表明, 该算法能够在峰值信噪比和码流比特率变化轻微的前提下减少50%以上的运算量。

关键词: H.264/AVC; 视频编码; 帧内预测

Fast intra mode decision algorithm based on directional gradients for H.264/AVC

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Abstract:

A directional gradients operator is proposed in this paper, and a novel H.264 intra prediction was introduced based on this operator. First of all, an encoding 16×16 macro block was divided into sixteen 4×4 sub-block. Using this directional gradients operator, an encoding 4×4 luma sub-block's texture feature and grey level fluctuation can be calculated. Based on these features, some dispensable 4×4 intra prediction modes were cut down. Furthermore, the 16×16 macro block's texture feature and grey level fluctuation can be judged according to statistical information of each 4×4 sub-block's candidate intra prediction modes. And the 16×16 candidate intra prediction modes can be decided by using the threshold of directional gradient strength value. The rate distortion optimization process should be done among the 4×4 and 16×16 candidate intra prediction modes and the best luma intra prediction mode should be decided. In addition, 8×8 chroma block intra prediction modes could also be reduced based on the corresponding luma macro block. In all, the number of intra prediction mode was reduced up to 50%, and the computational complexity was highly reduced. According to experiments, the proposed method could reduce the encoding time of overall sequence by about 50% without noticeable degradation of coding quality.

Keywords: H.264/AVC video encode intra predication

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