A Context-based Adaptive Fast Intra_4x4 Prediction Mode Decision Algorithm for H.264/AVC Video Coding

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Abstract: In this paper, we propose a context-based adaptive fast Intra_4x4 prediction mode decision algorithm for H.264/AVC. Firstly, a 3-order Markov random field model is introduced to describe the spatial distribution of RD optimal Intra_4x4 prediction modes at picture level. Secondly, in a neighboring context specified by this model, only a small set of candidate modes are chosen for RDO calculation according to a constrained error probability criterion. Thirdly, to reduce candidate modes further, thresholds which can be estimated by linear regression are adopted to perform early terminations.

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Finally, the proposed algorithm can adapt itself well to diverse video sequences due to an ability of automatic adjustment, while the model and thresholds are initialized off-line by statistics. No apparent computational overheads are involved throughout the algorithm. Experiments show that the novel fast algorithm searches only 2 – 6 Intra_4x4 modes per block and reduces up to 55% encoding time with a penalty on coding efficiency less than 0.1 dB.