

Spatiotemporal Adaptive Quantization for Video Compression Applications

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Abstract — JCT-VC HEVC HM includes a Coding Unit (CU) level adaptive Quantization Parameter (QP) technique named AdaptiveQP. It is designed to perceptually adjust the QP in Y, Cb and Cr Coding Blocks (CBs) based only on the variance of samples in a luma CB. In this paper, we propose an adaptive quantisation technique that consists of two contributions. The first contribution relates to accounting for the variance of chroma samples, in addition to luma samples, in a CU. The second contribution relates to accounting for CU temporal information as well as CU spatial information. Moreover, we integrate into our method a lambda refined QP technique to reduce complexity associated multiple QP optimizations in the Rate Distortion Optimization process. We evaluate the proposed technique on 4:4:4, 4:2:2, 4:2:0 and 4:0:0 YCbCr test sequences, for which we quantify the results using the Bjøntegaard Delta Rate (BD-Rate) metric. Our method achieves a maximum BD-Rate reduction of 23.1% (Y), 26.7% (Cr) and 25.2% (Cb). Furthermore, a maximum encoding time reduction of 4.4% is achieved.