Re-estimation of Motion and Reconstruction for Distributed Video Coding - DTU Orbit (30/12/2018)

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Transform domain Wyner-Ziv (TDWZ) video coding is an efficient approach to distributed video coding (DVC), which provides low complexity encoding by exploiting the source statistics at the decoder side. The DVC coding efficiency depends mainly on side information and noise modeling. This paper proposes a motion re-estimation technique based on optical flow to improve side information and noise residual frames by taking partially decoded information into account. To improve noise modeling, a noise residual motion re-estimation technique is proposed. Residual motion compensation with motion updating is used to estimate a current residue based on previously decoded frames and correlation between estimated side information frames. In addition, a generalized reconstruction algorithm to optimize a multihypothesis reconstruction is proposed. The proposed techniques using motion and reconstruction re-estimation (MORE) are integrated in the SING TDWZ codec, which uses side information and noise learning. For Wyner-Ziv frames using GOP size 2, the MORE codec significantly improves the TDWZ coding efficiency with an average (Bjøntegaard) PSNR improvement of 2.5 dB and up to 6 dB improvement compared with DISCOVER.

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