Locally Refined Motion Compensation for Future Video Coding

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Motion compensation plays a key role in high efficiency video coding. The popular video compression standards, such as H.264/AVC and HEVC, adopt block based motion compensation (MC) technique due to its high compression efficiency and relatively low computational complexity. However, block based MC may not be in accordance with the actual object boundary, potentially leading to low prediction accuracy especially in the high-texture areas. To address this issue, we propose a locally refined motion compensation (LRMC) algorithm. In particular, after the prediction block is obtained by the motion vector (MV), the image segmentation is subsequently applied on the prediction block. By this way, the transmission of the segmentation overheads can be avoided. As shown in Fig. 1, P_1 and P_2 denote the two parts after the image segmentation. It is observed that one part (P_1) belonging to the moving object sharing the MV with the whole block. For the other part (P_2), it belongs to the background and shares the identical MV with the neighboring blocks. Therefore, we detect the similarity between the segmented parts and the neighboring blocks to separate which part is the background area and the other part belongs to the moving object. Considering the MV of the whole block is usually searched conforming to the moving object, the prediction signal of the moving part remains. For the other part belonging to background area, its MV is derived from the neighboring blocks and then refined prediction signal is generated to substitute the original values. Experimental results show that the proposed algorithm can achieve 0.8%, 1.1% and 1.7% bitrate savings for Random Access, Lowdelay-B and Lowdelay-P configurations respectively. In addition, negligible computational complexity is introduced on the encoder site and only 9% time increasing on the decoder site.

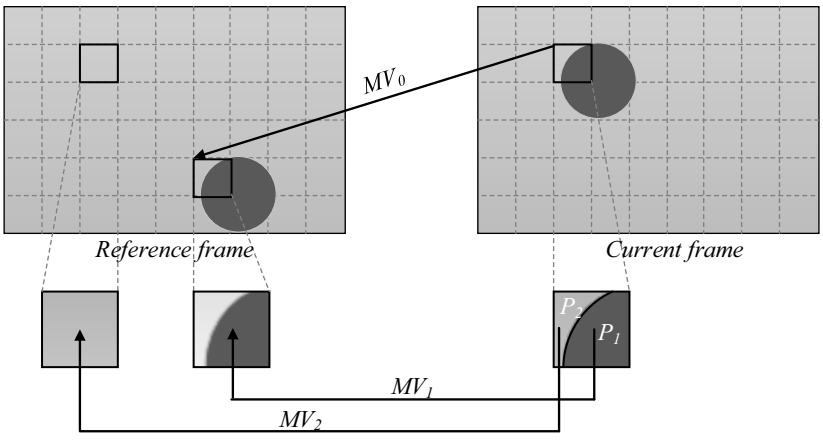

Figure 3: Illustration of the proposed LRMC scheme.

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