

Up-sampling Dependent Frame Rate Reduction for Low Bit-rate Video Coding

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Abstract

In low bit rate video coding, the frame rate of input sequence can be reduced to the half or even smaller portion by skipping or deleting frames before compression, and then the temporal resolution is restored via up-sampling at the decoder side. Numerous algorithms have been developed to address the problem of temporal resolution improvement. Actually, the quality of up-sampled frames depends on not only the performance of up-sampling method but also the information maintained in the down-sampled video sequence. To improve the quality of up-sampled frames and smooth the quality between the up-sampled and decompressed frames, this paper proposes an up-sampling dependent frame rate reduction, which is shown in Fig. 1. The proposed low bit rate video coding scheme is composed of up-sampling dependent frame rate reduction, compression, decompression and up-sampling components. The proposed frame rate reduction method is hinged to the temporal up-sampling. It is noted that there is a feedback between frame rate reduction and up-sampling in the proposed up-sampling dependent frame rate reduction, of which the goal is to obtain a down-sampled sequence maintaining more information about the frames to be up-sampled at the decoder side.

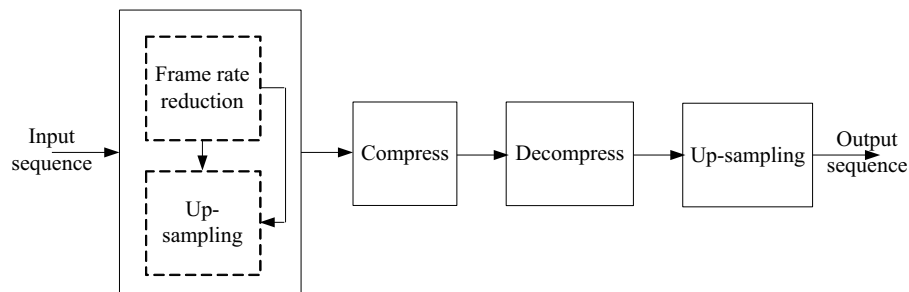


Fig. 1 The proposed low bit rate video coding based on up-sampling dependent frame rate reduction

For a particular up-sampling method, e.g., motion compensation frame interpolation, the optimal down-sampled frame is the one that not only minimizes the difference between the original and the down-sampled frames but also minimizes the difference between the original and the corresponding up-sampled frame.

Experimental results demonstrate that the proposed frame rate reduction is able to absorb more information of the up-sampled frames into the down-sampled sequence, thereby smooth the quality of up-sampled and decompressed frames at the decoder side.

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