Error Resilient Dual Frame Motion Compensation with Uneven Quality Protection

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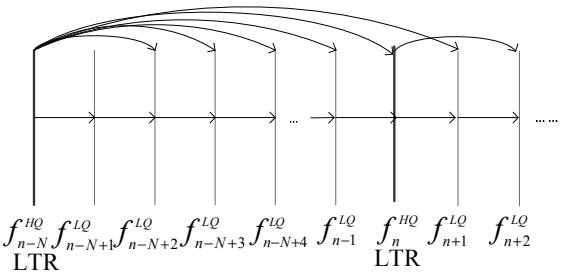

Fig. 1 Jump update dual frame motion compensation

In jump update dual frame motion compensation (JU-DFMC), two reference buffers are utilized for motion compensation, as shown in Fig. 1, the first reference buffer contains the most recently decoded frame, which is called short-term reference frame (STR), and the second one contains a reference frame from the past, which is named as long-term reference frame (LTR). The LTR is periodically updated. It remains static for N frames, and jumps forward to be the frame at a distance 2 back from the frame to be encoded.

Generally, the LTR is allocated more bits to be a high quality frame (HQF), such as the nth frame f_n^{HQ} and the (n-N)th frame f_{n-N}^{HQ} in Fig. 1; the other frames are allocated relatively lower bits to be a low quality frame (LQF), such as the (n+k)th frame (k=-N+1, -N+2, -N+3, -N+4,…, -1, 1, 2) in Fig. 1. LQF can be utilized as STR for the next frame, while the HQF can be utilized as LTR for following several frames.

In this paper, an error resilient JU-DFMC is proposed for video transmission over error-prone channels. In the proposed error resilient JU-DFMC, a new error resilient prediction structure of DFMC is firstly presented. The LQF can adaptively select reference frame according to different packet loss rate. Then the MB information is divided into two partition header information (A) and texture coefficients (B). Based on the partition, an end-to-end distortion model is applied for macroblock (MB) level mode decision. Finally a frame level rate distortion cost scheme is proposed to determine how many times the header information will be transmitted in a high quality frame (HQF). The HQF (LTR) is given more protection. The experimental results show that the proposed method can achieve better performance than the previous DFMC schemes. In the future, how to determine LQF header transmission times will be further exploited.

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