Improving the QoS of video streaming over lossy networks is a challenging topic of research. In this paper, we propose a novel content-based retransmission scheme for streaming 3-D wavelet compressed video. The fundamental idea is to consider the content of the packets and the traffic of the Internet simultaneously to optimize the QoS. In the encoding stage, the content information is generated and stored based on which an intelligent hybrid decision system is designed to perform a two-step optimization. First, the bandwidth used for transmitting each group of video frames (GOF) is dynamically allocated according to the changing traffic conditions such that the quality of video is consistent. Second, the scheme for retransmitting the lost packets is designed to minimize the distortion of video. The goal is to enable the streaming system to deliver the best possible quality of video under the same channel conditions. Simulation results show that the content-based retransmission can improve the quality of video by more than 2 dB in comparison with the existing non-content-based retransmission methods especially when the packet loss rate is high.

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