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基于延时预测的TCP实时视频传输方法

熊永华[1]，吴敏[1]，贾维嘉[2]

(1．中南大学 信息科学与工程学院，湖南 长沙，410083；
2．香港城市大学 计算机科学系，香港，999077)

摘 要：对TCP实时视频传输过程进行分析，指出发送延时是影响基于TCP的实时视频传输端到端延时的关键因素，并可通过其大小来判断视频帧的播放质量；提出一种递阶式马尔可夫预测模型，该模型通过输入视频帧长度、丢包率、网络往返时间和TCP拥塞窗口大小预测视频帧的发送延时，使用NS2(Network simulator 2)进行模拟。研究结果表明：在RED(Random early detection)策略下，可以通过模型的预测值来判断视频帧是否适合采用TCP传输，能为基于TCP的流媒体传输策略提供重要参考。

关键字：TCP；马尔可夫；实时视频；延时预测

A real-time video transmission method over TCP based on delay prediction

XIONG Yong-hua[1], WU Min[1], JIA Wei-jia[2]

（1. School of Information Science and Engineering, Central South University, Changsha 410083, China;
2. Department of Computer Science, City University of Hong Kong, Hong Kong 999077, China）

Abstract: The process of real-time video streaming across the Internet using TCP (transmission control protocol) was analyzed, and the sending-delays were found to be the critical influencing factors on the end-to-end delays of real-time video frame using TCP. A method that utilizes the sending-delays to judge the playing performance of the video frames was presented. A recursive Markov prediction model was proposed to predict the sending-delays of real-time video frames with input parameters as video frame lengths, network loss ratio, RTT (Round trip time) and TCP congestion window size. The NS2 simulator was introduced. The results show that the prediction value of video frame sending-delays can be used to determine whether it is feasible for a video frame to be transmitted using TCP, which provides importance reference for streaming transmission scheme based on TCP.

Key words:TCP; Markov; real-time video; delay prediction

地 址：湖南省长沙市中南大学　　邮编： 410083
电 话： 0731-88879765 传真： 0731-88877727
电子邮箱： zngdxb@mail.csu.edu.cn 湘ICP备09001153号