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An ARQ retransmission scheme for real-time video multicasting over mobile communication networks

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Multicast is an effective mechanism to substantially save network bandwidth while transmitting real-time video streams in a wireless mobile communication network (such as 3G/4G). However, today it lacks a packet retransmission scheme for real-time video multicasting in mobile communication networks. The last hop of a mobile communication network is defined as the hop between a base station (BS)/gateway and a mobile station (MS). Packet errors happen very easily in the last hop because wireless channels in a mobile communication network are error-prone. As a result, packet errors in the last hop may bring a critical deterioration of video quality at MS. Besides, an end-to-end retransmission scheme, such as TCP, cannot meet the strict delay constraints of a real-time video stream. Hence, in this paper, we propose a retransmission scheme to improve the quality of video multicasting in the last-hop of a mobile communication network. The proposed retransmission scheme requires MS in a multicast group to feedback ARQ (Automatic Repeated Request) messages to BS/Gateway. The proposed retransmission scheme is invoked under three considerations: The extra bandwidth cost for retransmitting the erroneous blocks, the retransmission delay, and the acceptable delay constraints at MS. NS-3 simulation is performed to demonstrate the superiority of the proposed retransmission scheme. From simulation, we reveal how well the retransmission scheme can reconstruct the quality of a multicast video stream at MS. Furthermore, the extra bandwidth cost for retransmitting erroneous blocks is investigated.

Biography

Tsang-Ling Sheu received the PhD degree in Computer Engineering from the Department of Electrical and Computer Engineering, Penn State University, University Park, Pennsylvania, USA, in 1989. From Sept. 1989 to July 1995, he worked with IBM Corporation at Research Triangle Park, North Carolina, USA. In Aug. 1995, he became an Associate Professor, and was promoted to full Professor in Jan. 2006 at the Dept. of Electrical Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan. His research interests include wireless networks, mobile communications, and multimedia networking. He was the recipient of the 1990 IBM outstanding paper award. He is a senior member of the IEEE, and the IEEE Communications Society.

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