电子与信息学报 2006 28 (6): 1049-1053 ISSN: 1009-5896 CN: 11-4494/TN

论文

基于MPEG-4的视频联合信源信道编码

李 平[①], 肖 嵩[②], 吴成柯[②], 唐 昆[①], 崔慧娟[①]

[①]清华大学电子工程系通信与微波研究所 北京 100084;[②]西安电子科技大学ISN国家重点实验室 西安 710071

收稿日期 2004-10-11 修回日期 2005-11-23 网络版发布日期 2007-11-30 接受日期

摘要
该文提出了一种用于提高MPEG-4码流在噪声信道下的抗误码性能的联合信源信道编码方法。该方法将MPEG-4基本层按重要性进行码流重排后进行交织打包，并根据率失真函数将基本层纹理信息进一步划分为多个子层。编码器根据反映信道状态的反馈信息动态地调整传输的子层数目和每个子层的纠错强度(信道编码速率)，使得系统失真最小。仿真结果表明，该方法明显优于未保护的MPEG-4方法，在相同信道带宽及丢包率条件下比等纠错保护的MPEG-4编码方法获得更加稳定的性能。同时由于该方法根据反馈的出错分组数进行传输子层数和纠错强度的联合优化，与Puri等人提出的按照确定信道条件设计目标函数进行优化的MDFEC方法相比，更能够适应信道条件的变化，从而获得更高的性能。

关键词 MPEG-4 联合信源信道编码 Reed-Solomon(RS) 率失真

分类号 TN911.2

Joint Source Channel Coding of MPEG-4 Video

Li Ping[①], Xiao Song[②], Wu Cheng-ke[②], Tang Kun[①], Cui Hui-juan[①]

[①]Communication and Microwave Lab., Dept. Electrical Engineering, Tsinghua University, Beijing 100084, China;
[②]ISN National Key Lab., Xidian University, Xi'an 710071, China

Abstract
A new robust joint source channel coding method for MPEG-4 video over noisy channel is proposed. In the method, the base layer bit streams are reordered according to their relative importance and then interlaced packetized. Multiple sub-layers of texture information are generated based on their rate distortion function, the number of which is adjusted dynamically by the encoder according to the feedback information to minimize the overall distortion. Simulation results show that the method has the performance obviously higher than that of un-protected MPEG-4, and can be more stable than MPEG-4 equal error protection method under the same conditions of bandwidth and packet loss rate. Since the method makes joint optimization to the the number of transmission sublayers and the protection level according to the feedback parameter, it can be more adaptive to the channel situation and can obtain higher performance compared with MDFEC method proposed by Puri, which design the object functions and perfoms optimization according to the fixed channel situation.

Key words MPEG-4 Joint source channel coding Reed-Solomon(RS) Rate distortion

DOI:

通讯作者

作者个人主页 李 平[①]; 肖 嵩[②]; 吴成柯[②]; 唐 昆[①]; 崔慧娟[①]