

短文与研究通讯

基于H.264和双树小波的多描述视频编码

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摘要:

本文针对互联网和无线信道等不可靠网络的视频传输问题, 提出一种基于H.264和双树小波变换的多描述视频编码解决方案。采用分层的多描述视频编码框架, 实现H.264和双树小波编码的有机结合。基本层用H.264编码器对视频信号进行低码率编码后, 复制到各个描述; 增强层用三维双树小波变换对原视频和基本层重建视频的差值进行编码, 将产生的四棵三维小波树经噪声整形后两两组合, 编码送到不同描述。在解码端, 若能够接收到两个描述, 则通过中心解码器实现高质量的视频重建; 若丢失一个描述, 则通过边解码器解码仍可保证一定质量的视频重建。实验结果表明在相同码率下, 本算法的视频中心解码和边解码质量优于现有的多描述视频编码算法。

关键词: 多描述视频编码 分层编码 H 264 双树小波变换

H.264 and Dual-tree Wavelet Transform based multiple description video coding

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Abstract:

A H.264 and dual-tree discrete wavelet transform (DDWT) based multiple description video coding algorithm is proposed to solve the transmitting error or packet loss problem due to Internet or wireless network channel failure. Each description of the proposed multiple description coding scheme consists of a base layer and an enhancement layer. First, the input image sequence is coded by a standard H.264 encoder in low bit rate to form the base layer, which is to be duplicated to each description. Then the error frames of the base layer and the input image sequence is coded by a 3D dual-tree wavelet encoder to produce four coefficient trees. After noise-shaped, these four trees are partitioned into two groups, forming the enhancement layer of related descriptions. If all descriptions are received, a high quality video can be reconstructed by a central decoder. If only one description is received, a side decoder can be used to guarantee an acceptable quality reconstructed video. The simulation results have shown that the quality of reconstructed video by the proposed algorithm outperforms the state-of-the-art of multiple description video coding methods.

Keywords: multiple description video coding layered coding H.264; dual-tree discrete wavelet transform

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