

论文与技术报告

基于Weibull率失真简化模型的帧比特分配算法

霍炎, 荆涛, 蒋笑冰, 蒙海光

北京交通大学 电子信息工程学院

摘要:

为在确保视频压缩码流平稳且带宽受限的情况下提升重建视频质量, 本文针对使用Weibull密度分布对压缩视频序列率失真性能分析的方法, 对其模型进行数学简化, 并以帧层编码速率控制的缓冲器充盈度和重建视频质量为目标, 提出了一种新的H.264压缩视频速率控制方法——帧比特分配算法。该算法以H.264的JM16.1为视频压缩编码平台, 将简化率失真模型嵌入速率控制算法中, 以一个GOP为控制单元对其内部各图像帧进行比特分配与调整, 同时以帧为周期进行算法模型参数更新。实验结果表明, 本文提出的算法要比JVT-H017的算法在重建视频客观质量(PSNR)方面平均有0.30dB的改善, 并能够得到更加平稳质量的视频输出。在实际输出码率方面, 本文算法比JVT-H017的算法更低, 并且编码缓冲器充盈度较JVT-H017平稳且没有上下溢的情况出现。

关键词: Weibull率失真模型; 码率量化模型; 帧比特分配算法; 码率控制

Frame Bit Allocation via Weibull-Based Simple Rate-Distortion Models

HUO Yan, JING Tao, JIANG Xiao-Bing, MENG Hai-Guang

School of Electronics and Information Engineering, Beijing Jiaotong University

Abstract:

In order to improve reconstruction video quality in the case of smoothing compression stream and bandwidth constraint, the rate-distortion properties of compressed video sequence are analyzed and simplified by Weibull Density Distribution. And then the novel rate control algorithm that is frame bit allocation on H.264 compressed video is proposed based on frame control for the buffer fullness and reconstruction video quality. With the simplified rate distortion model, the algorithm is considered on H.264 JM16.1 system platform, which is allocated and adjusted in each frame in GOP, meanwhile the parameters of algorithm and model are updated in each frame. Simulation experiments results show that a 0.3dB average peak signal-to-noise ratio (PSNR) improvement over the JVT-H017 rate control algorithm and we can obtain more smoothly quality video output. The results also show that we can obtain lower actual output rate and more smoothly buffer status that avoid overflow and underflow conditions.

Keywords: Weibull rate distribution model R Q model Frame bit allocation rate control

收稿日期 2011-03-16 修回日期 2011-04-07 网络版发布日期 2011-06-25

DOI:

基金项目:

国家自然科学基金资助项目 (No. 61073160, 60972151, 61071143, 61071152); 国家重大基础研究973计划 (No.2010CB731403, 2010CB731406)

通讯作者:

作者简介:

作者Email: greathuo@126.com

参考文献:

本刊中的类似文章

文章评论

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(1141KB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ Weibull率失真模型; 码率量化模型; 帧比特分配算法; 码率控制

本文作者相关文章

- ▶ 霍炎
- ▶ 荆涛
- ▶ 蒋笑冰
- ▶ 蒙海光

PubMed

- ▶ Article by Huo, Y.
- ▶ Article by Jing, T.
- ▶ Article by Jiang, X. B.
- ▶ Article by Meng, H. G.

反馈人	<input type="text"/>	邮箱地址	<input type="text"/>
反馈标题	<input type="text"/>	验证码	<input type="text" value="9253"/>