西安电子科技大学学报 2008 35 (6): 1115-1120 ISSN: 1001-2400 CN: 61-1076/TN

一种自适应的AR-FGS漏因子选择算法

邓云1, 2, 彭强1, 诸昌钤1

(1. 西南交通大学 信息科学与技术学院，四川 成都 610031；
2. 四川理工学院，四川 自贡 643000)

收稿日期 2007-12-7 修回日期 网络版发布日期 2008-11-19 接受日期

摘要 AR-FGS(Adaptive Reference for Fine Granular Scalable)使用漏预测在编码效率和码流鲁棒性间取得平衡. 针对漏因子对漏预测效果影响至关重要的问题，提出了一种自适应的漏因子选择算法. 分析发现JSVM(Joint Scalable Video Model)中对每帧按相同比例进行码流截取的方式存在着输出码率在帧级上不平滑的问题，为此提出按固定帧总数据量的方式进行截断的码流截取算法，保证输出码率在帧级上的平滑. 根据当前参考帧基本层数据量与第一帧基本层数据量的比值为每帧单独决定最优的漏因子，并根据短期平均基本层数据量与当前参考帧基本层数据量的比值，对选择的漏因子进行调节. 实验结果表明，算法产生的码流在大部分码率范围内PSNR值高于使用固定漏因子的最高PSNR值. 此外，修改的码流截取方式产生的码流在帧级数据量上平滑.

关键词 视频编码 AR-FGS漏预测 漏因子 码流截取 JSVM
分类号 TP391

Adaptive leaky factor selection algorithm for AR-FGS

DENG Yun1,2,PENG Qiang1,ZHU Chang-qian1

(1. School of Information Sci. and Tech., Southewest Jiaotong Univ., Chengdu 610031， China;
2. Sichuan Inst. of Tech., Zigong 643000， China)

Abstract

AR-FGS (Adaptive Reference for Fine Granular Scalable) adopts leaky prediction to achieve a better tradeoff between coding efficiency and robustness. The leaky factor is crucial to the performance of leaky prediction. This paper proposes an adaptive method for determining the optimal leaky factor for each frame. First, the disadvantage of the bit-stream extraction method used in the current JSVM (Joint Scalable Video Model) is analyzed that the bit-rate of extracted sub-steam is not smooth at the frame level. To guarantee the smoothness, a modified extraction method is presented which truncates each frame at the fixed total bit-rate. The proposed leaky factor determination algorithm sets the optimal leaky factor for each frame according to the ratio of current reference frame's base layer bit-rate to that of the first I-frame's. The optimal leaky factor is further adjusted according to the ratio of several previous frames' average base layer bit-rate to that of current reference frame's. Simulation results show that the proposed algorithm can further improve the PSNR over a wide range of bit-rate, compared with the use of the fixed leaky factor. Additionally, the bit-rate of sub-stream extracted by the modified bit-stream extraction method is smooth at the frame level.

Key words video coding AR-FGS leaky prediction leaky factor bit-stream extraction JSVM

DOI:

通讯作者 邓云 dragon_dy@163.com