Telecommunication Standardization Sector Document AVC-455
Study Group 15
Experts Group for ATM Video Coding
(Rapporteur's Group on Part of Q.2/15)

SOURCE : Japan
TITLE : Fix for the noisy background problem in leaky prediction
PURPOSE : Information

1. Introduction

Leaky prediction has been proposed as a mean for temporal localization of errors and for channel hopping compensation. However, the noisy background problem degrades visual picture quality. In this document, a combination method of periodic leaky prediction with adaptive MB quantization was examined thorough computer simulation to cope with the problem.

2. Combination method

The method consists of two steps. The first one is to use rather stronger leak factor on a periodic basis and use no leak on the remaining pictures (AT&T proposal). The second one is using a fine(fixed) quantizer for the MBs which are detected as background. For the background detection, "act" value which is obtained in step 3 in the TM4 rate control algorithm is used.

3. Computer simulation

Computer simulation were performed based on a TM4 based coding algorithm. As for the syntax for leaky prediction, TM3 syntax was adopted. The simulation conditions were as follows.

- Picture format : 4:2:0
- GOP structure : M=1, N=150 (IPPPP....)
- Picture structure : Frame picture
- Prediction method : Adaptive frame/field
- Bit rate : 4 Mb/s
- Leak factor : $1-1/2^3$ for each 3 frames
- Background MB decision : act < 5
- MQUANT for background : 4

Table 1 shows the simulation results for intra-slice method (default low delay mode) and the proposed method. According to the results, both methods give almost the same SNRs. In subjective evaluation of the picture quality, no significant differences were observed except for a little noisy part in Mobile & Calendar by leaky prediction. Some of the reproduced pictures will be demonstrated by VCR at the meeting.

3. Conclusion

A combination method of periodic leaky prediction and adaptive MB quantization was proposed for the purpose of fixing the noisy background problem. The results indicated that the method was effective to solve the problem.

Table 1: Average SNR(dB)

	Intra slice	Leaky prediction
Flower Garden	Y : 27.26 Cb: 33.18 Cr: 31.05	Y : 27.33 Cb: 32.96 Cr: 30.97
Mobile & Calendar	Y : 25.71 Cb: 31.52 Cr: 31.71	Y : 25.69 Cb: 31.33 Cr: 31.48