CCITT SGXV
Working Party XV/1
Experts Group for ATM Video Coding

Source: **GC Technology** Corp., Japan
Title: **Experiment of low delay mode**
Purpose: Information

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Introduction

We compared some kinds of low delay modes. Lower delay mode is realized with fewer pictures having backward predictions. On the other hand, the backward prediction was effective to achive high coding performance as a result of our experiments. Therefore, these modes may be implemented at the sacrifice of SNR.

Simulation methods

In our experiments, we compared four cases of low delay modes using SM3 frame base, i.e. M=1, M=2, M=3, and M=2 without backward predictions. These modes are summalized as below:

1) IPPPPP..., (M=1),
2) BIBPBP..., (M=2),
3) BBIBBP..., (M=3),
4) P'IP'PP'P..., (M=2, without backward predictions),

where P' denotes a non-recursive P-picture.

Conditions

Coding algorithm:	SM3 frame base.
Input image data:	CCIR601, four sequences x 150 frames.
Merging:	Simple field merging.
Size:	30 slices/picture, 44 MBs/slice, 12 frames/GOP.
Pre-processing:	vertical downsampling for chrominance (Fig.1).
Post-processing:	vertical upsampling for chrominance (Fig.1).
Moving estimation:	telescopic search.
Rate control:	SM3 rate control (Bit rate: 4 Mbps, Buffer length: 400kbits)

Results

SNR of a GOP is illustrated in Fig.2 and average SNR of 150 frames is shown in Fig.3. Observing our results, we can conclude that M=3 case has the best performance. The lowest delay mode (M=1 case) is implemented at the sacrifice of 2 dB compared to M=3 case for 'mobile' but there is no large difference for 'popple'.

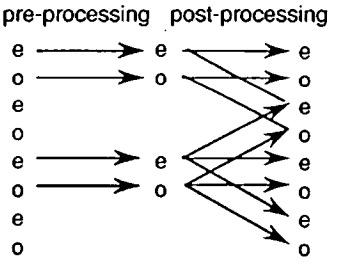
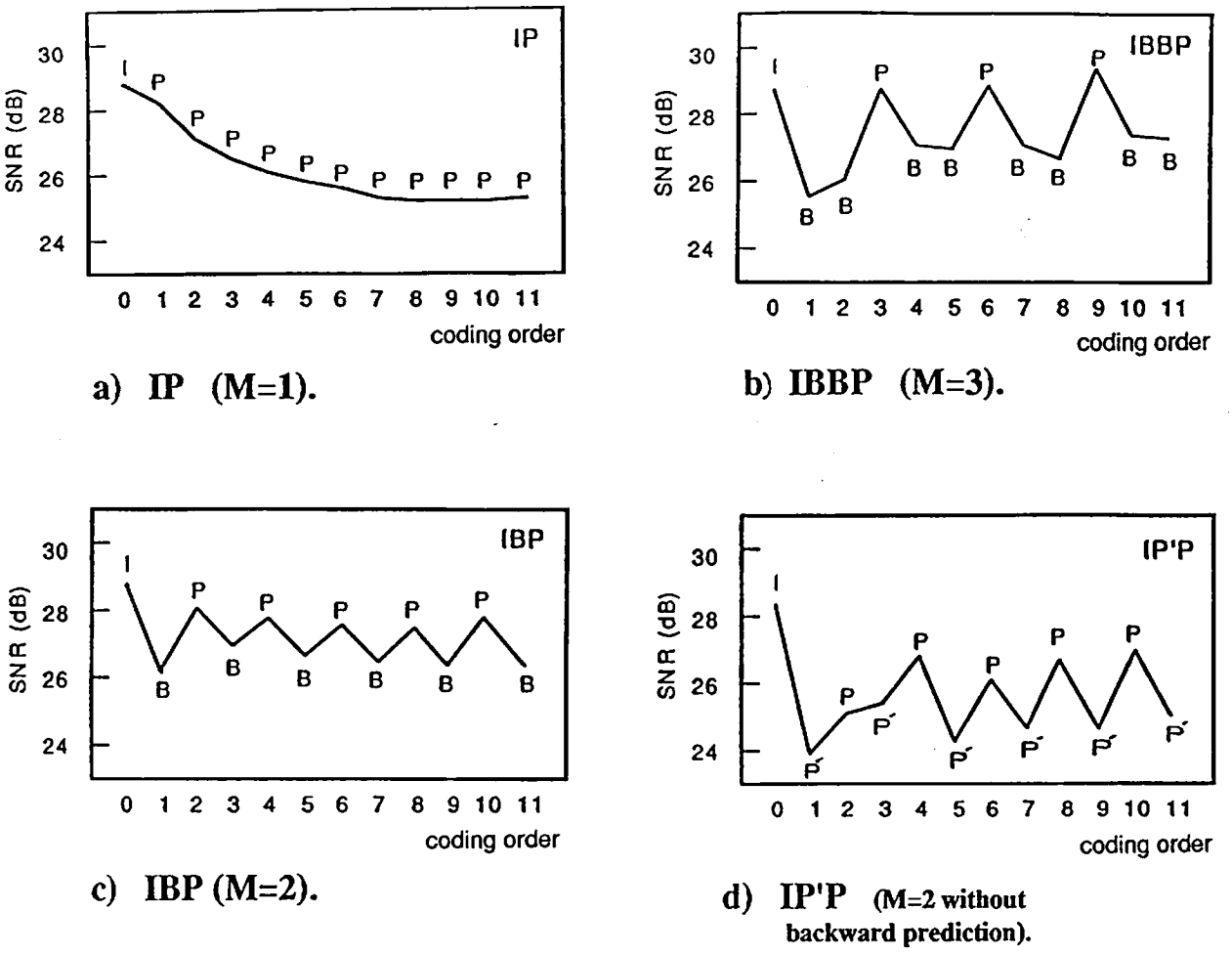


Fig.1 Pre- and post-processing for chrominance.
(e: even line, o: odd line.)



a) IP (M=1).

b) IBBP (M=3).

c) IBP (M=2).

d) IP'P (M=2 without backward prediction).

Fig.2 SNR of a GOP. (Mobile & calender', Luminance)

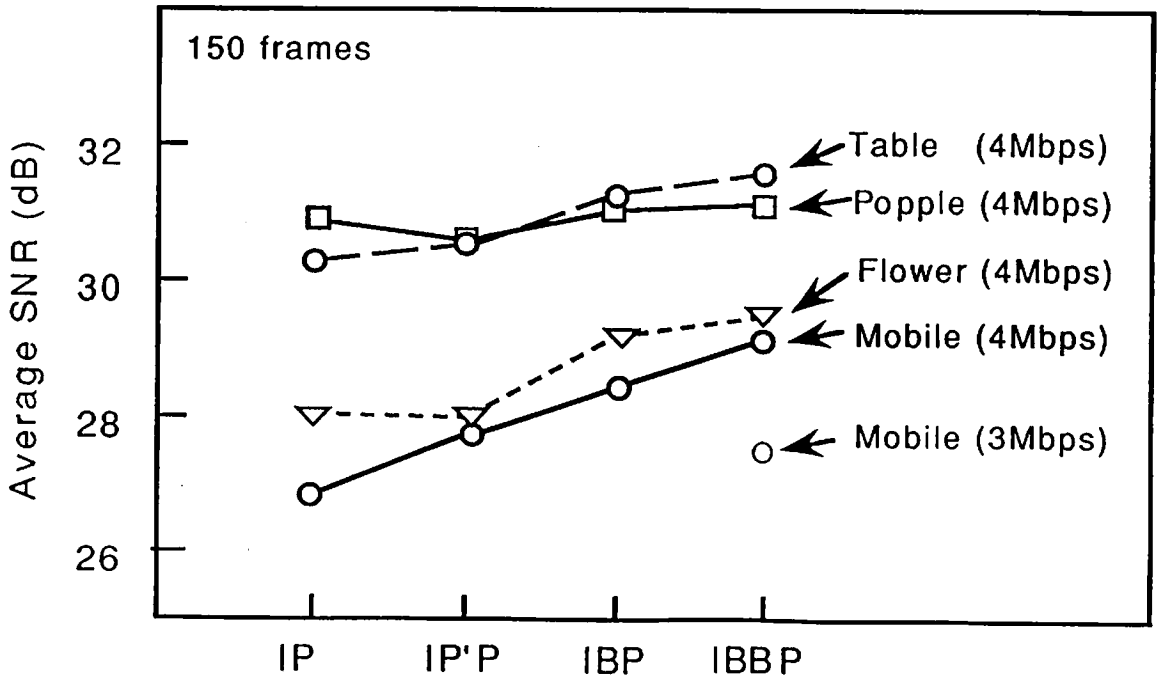


Fig.3 Average SNR of 150 frames. (Luminance)