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SOURCE : JAPAN
TITLE : HDTV Coding by Test Model 2
PURPOSE : Information

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1. Introduction

Test model(TM) has been investigated in MPEG and CCITT. However its perfomance for high resolution picture format, such as HDTV, is not well known yet. We have tried the video compression of Hi-Vision (HDTV standard in Japan) with use of TM2. The simulation results are described below.

2. Simulations with TM2

Digital signal processing of HDTV usually needs huge amount of CPU time. Therefore simple IPP mode is employed at the initial step of this investigation. No "pre-" or "post-" process is involved in the simulation. The details of the condition are as follows;

-picture format:	4:2:0
	Y 1920 pels by 1024 lines
	Pb,Pr 960 pels by 512 lines
-structure:	frame
-prediction:	field/frame, N=60, M=1
-rate control:	TM2 step2

Our simulation uses two kinds of digital video signals whose duration time is 60 frames long each. Figure 1 shows Scene A that has a "scene change" in the middle of the sequence and the girls standing at the center turn around both in former and latter part of the sequence. The backgrands have little motion in each. Figure 2 shows Scene B that has a quick zoom out, and as a result, has large moving area.

In the simulation, Scene A and B are coded with TM2 at the expected transmission rate of 30Mbps, 45Mbps and 60Mbps. Time fluctuations of luminance SNRs and number of bits per frame are plotted in Figure 2 and 3.

3. Picture Quality Evaluation

The processed pictures have been evaluated with 32 inches Hi-Vision monitor. The pictures were observed just in front of it. Observation results are as follows.

3.1 The Former Part of Scene A

No difference was observed between the original and each processed picture.

3.2 The Latter Part of Scene A

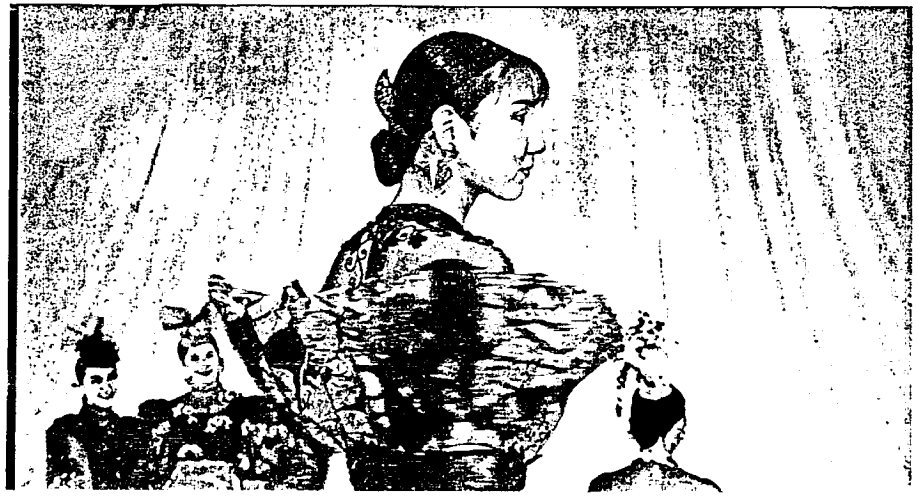
At the expected transmission rate of 30Mbps, some granular noise was observed around the face of the girl standing in the center and in the dress of sitting girl. Those adverse effect was almost improved at 45Mbps and 60Mbps.

3.3 Scene B

At 30Mbps, Some quality deterioration could be observed in the face of the sitting girl, and granular noise also appeared around the branches on the table. The picture quality was improved at 45Mbps and 60Mbps, but the noise remained slightly around the face and branches.

4. Conclusion

Two kinds of Hi-Vision digital video signals have been coded using IPP mode of TM2 without any "pre-" or "post-" process. Some deterioration of picture quality was observed at the expected transmission rate of 30Mbps. However, better results were obtained at 45Mbps and 60Mbps. The method of the improvemnt is a further study.



1 / Scene A

31 / Scene A

Figure 1

1 / Scene B

60 / Scene B

Figure 2

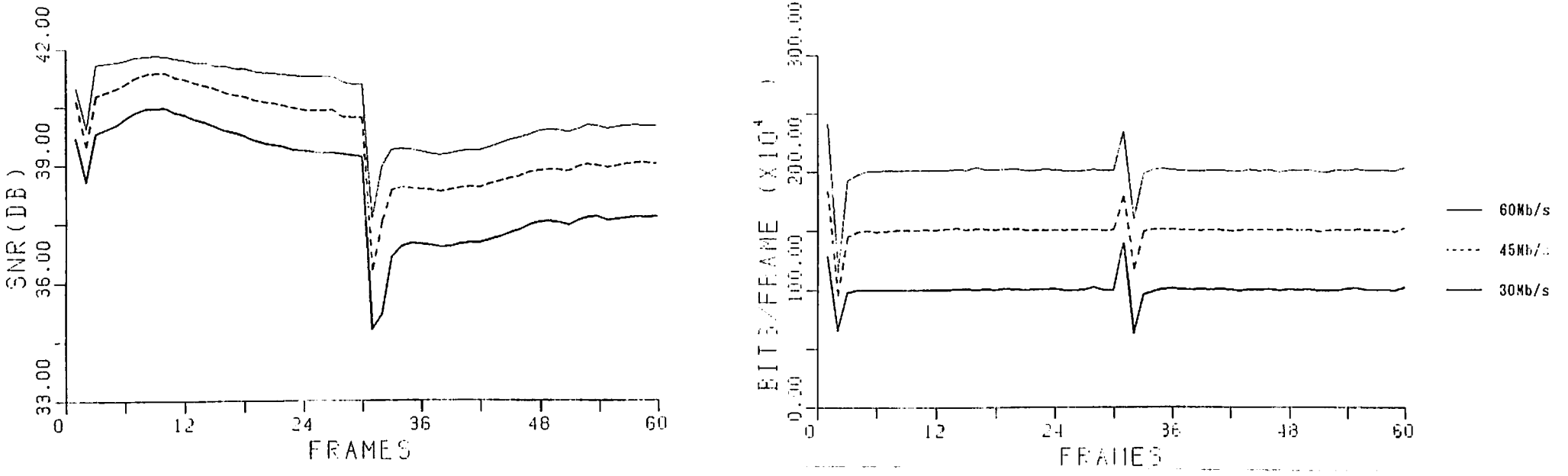


Figure 3 Results of Coding Scene A

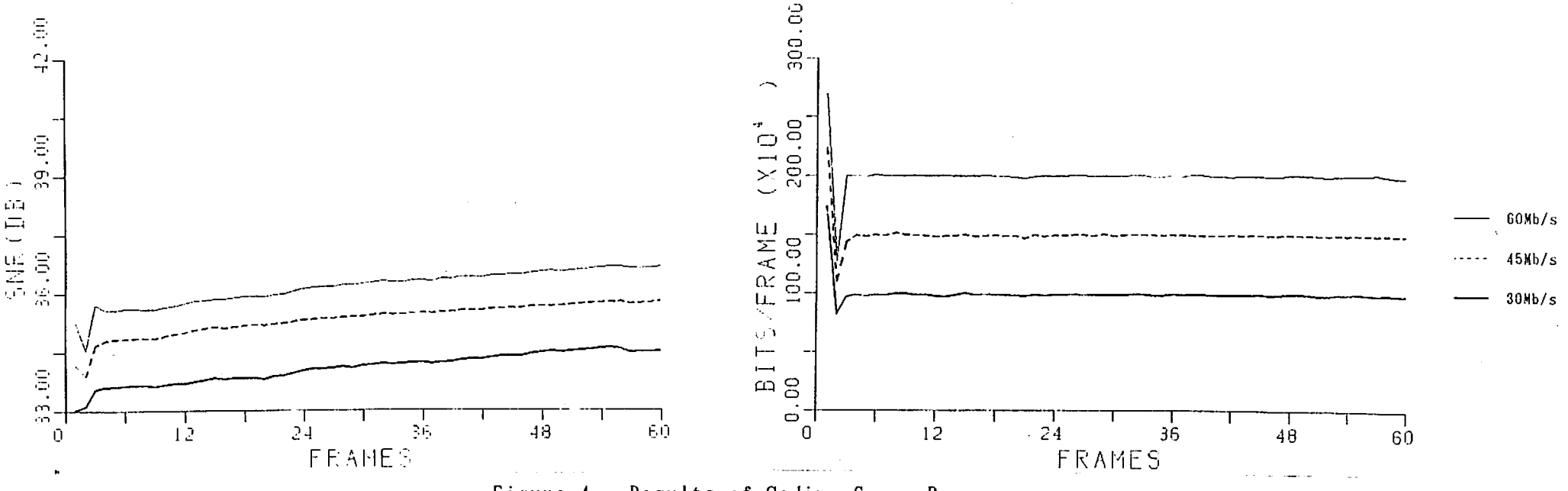


Figure 4 Results of Coding Scene B