

SOURCE : JAPAN  
TITLE : IMPACT OF SCIF CONVERSION ON PREDICTION STRUCTURE  
PURPOSE: Information

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## 1. Introduction

One of the study items for the practicality of SCIF concept is to investigate its impact on the efficiency of coding CCIR 601 signals. Our previous work for the progressive scan SCIF as in AVC-29 indicated that coding through SCIF loses 25-30% in efficiency and that multiple frame prediction is required when the field of 525/60 signal is converted to the SCIF frame (see AVC-79, August 1991).

This contribution reports experimental results addressing how the prediction structure be affected by the format conversion method using the conversion filter described in AVC-203 (NTA, January 1992). Frame rate conversion as well as line number conversion has been experimented.

## 2. Method of simulation experiments

A CCITT Reference Model based hybrid coding algorithm is used for the source coding format investigation (see AVC-79). A structure of IPPPP... is used in the open loop experiment to measure the rate-distortion characteristics. Due to the simulation program limitation, successive frames of 480 lines are coded.

Test sequences of 525/60 version are converted into the source coding input according to the NTA filter.

- Frame rate conversion: original 10 interlace fields having 240 lines are converted into 12 progressive scan frames having 480 lines.
- Line number conversion: original 10 lines of two successive interlace fields are converted into 12 lines of a progressive scan SCIF frame. Only 480 lines in the center are coded.

Multiple frame prediction is used where previous 1, 2 or 3 coded frames are referred to for motion compensated prediction. SNR is measured between an input SCIF picture and its coded output picture.

Note: NTA up- and down-conversion filters (AVC-203 and 213) give 1/4 line shifted pictures compared to the original. SNR comparison at 525/60 pictures has not yet been done but may include distortion due to this dislocation.

## 3. Results

Measured rate-distortion characteristics are shown in Figure 1 for the frame rate conversion and in Figure 2 for line number conversion. Rate represents here number of bits per original frame period (1/30 second).

When compared to ordinary single frame prediction at SNR=36 dB, coded information for multiframe prediction reduces as follows:

#### Frame rate conversion

	FLOW	MBCL	FOOT	
Reference to previous 3 frames		11.8%	7.5%	0%
Reference to previous 2 frames		11.8%	12.6%	0%

#### Frame rate conversion

	FLOW	MBCL	FOOT	
Reference to previous 3 frames		25.0%	11.7%	0%
Reference to previous 2 frames		25.0%	11.8%	0%

#### 4. Conclusion

If NTA filters are used for conversion to/from SCIF, an SCIF frame is generated by using three successive fields of original CCIR-601 signals in case of frame rate conversion and two successive fields in case of line number conversion. In either case, single frame prediction shows significant reduction in coding efficiency compared to multiple frame prediction.

As a conclusion, we have to carefully define prediction structure taking into account practical conversion methods if SCIF is employed as a source coding input format.

END

Figure 1

CODING VIA SCIF - FRAME RATE CONVERSION  
using NTA filters and n-frame prediction

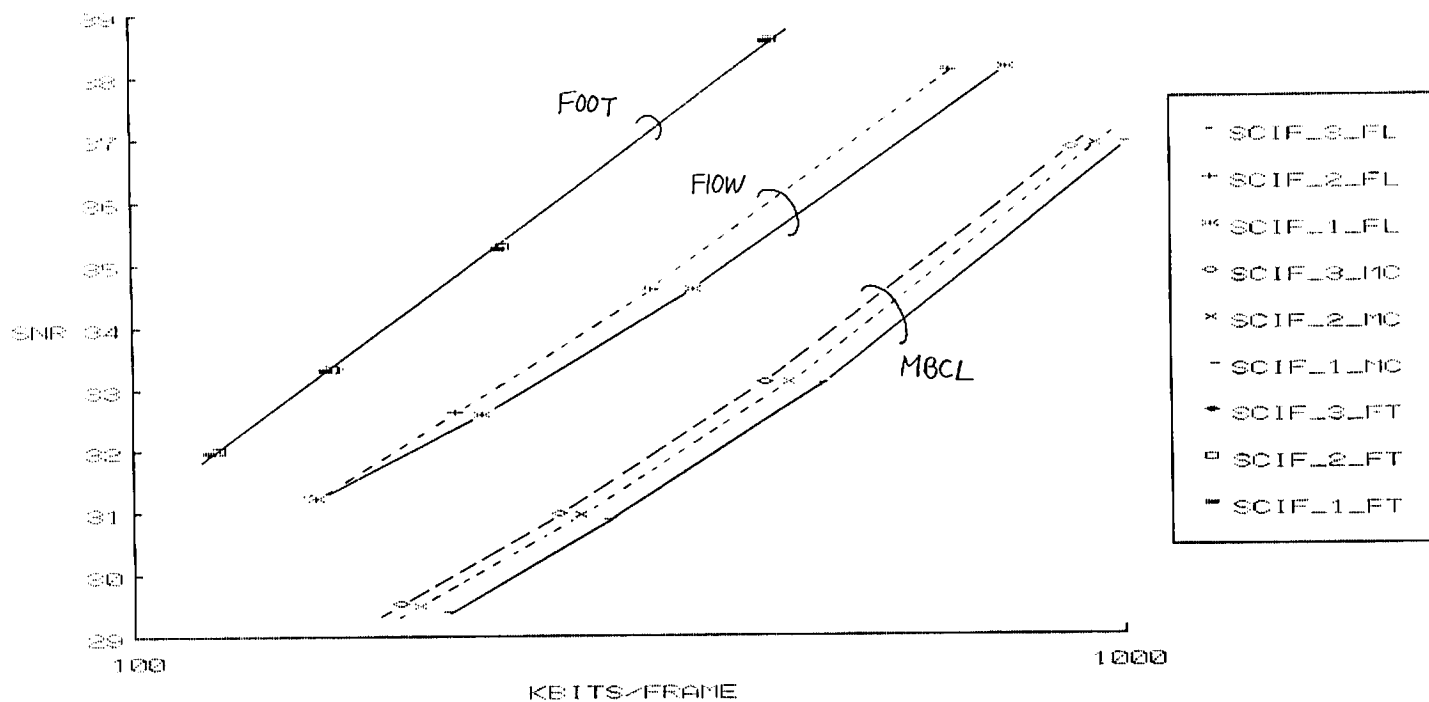


Figure 2

CODING VIA SCIF - LINE NUMBER CONVERSION  
using NTA filters and n-frame prediction

