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

Document AVC-239R
March 9, 1992

SOURCE : Japan

TITLE : Performance of progressive SCIF

PURPOSE : Information

---

1. Introduction

As a candidate of SCIF, progressive format (720 × 576 × 60, 1:1) is investigated from the point of format conversion and coding efficiency.

2. Picture format conversion

Although specific scheme of format conversions (local formats ↔ the common format) may not be a matter of standardization work, we must confirm that picture quality in some conversion scheme is sufficient for higher rate applications.

In the process of a format conversion (720 × 480 × 60, 2:1 → SCIF) the following interlace → progressive conversion schemes are compared by SNR and subjective evaluation. All of them were combined with an identical line number conversion scheme (AVC-80 ANNEX 2).

CNV1: Intra-field line insertion

Skipped lines are inserted by a 16 tap filter (AVC-80 ANNEX 1 (ii)) in a field.
Inserted lines are skipped in the inverse conversion.

CNV2: Adaptive intra-field/inter-field line insertion

Skipped lines are inserted adaptively by average signal values of two fields or by the 16 tap filter in a field (Fig. 1).
Inserted lines are skipped in the inverse conversion.

CNV3: Intra-field line shift

All the lines are obtained at shifted locations, i.e., signal values at the distance of half a line (Fig. 2) are calculated by a 16 tap filter (AVC-80 ANNEX 1(i)).
Lines are re-shifted and skipped by another 16 tap filter (AVC-80 ANNEX 1(ii)) in the inverse conversion.

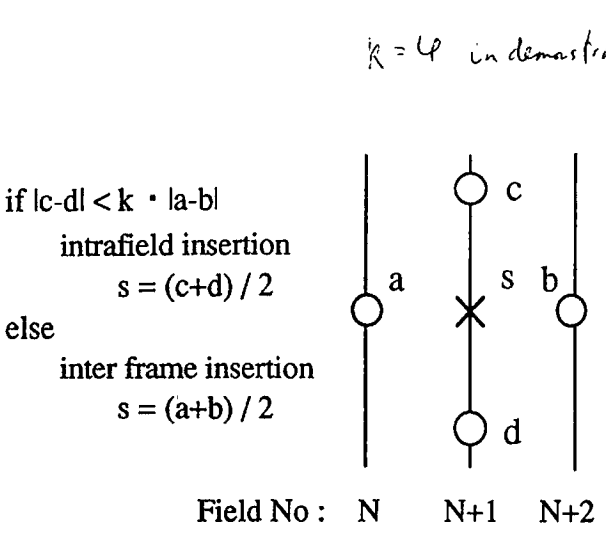

Fig. 1 Adaptive line insertion

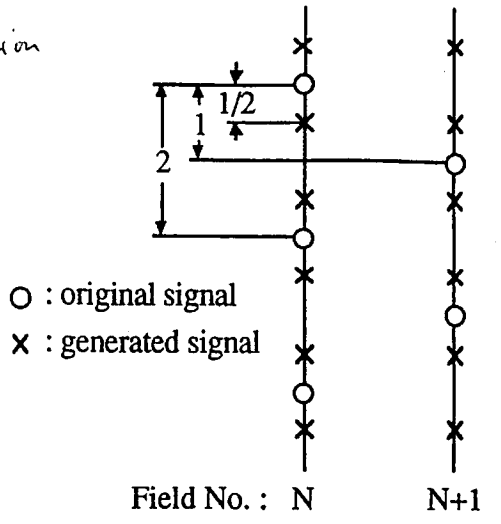

Fig. 2 Intra-field line shift

SNRs for the conversion and inverse conversion are shown in Table 1. As to the local format of 720 × 480 × 60, 2:1, quality of conversion and inverse conversion is sufficient.

Observing one converted frame (SCIF format) of Flower Garden by a NTSC monitor, picture qualities are compared as shown in Table 2.

Table 1 Results of conversion and inverse conversion
(720 × 480 × 60, 2:1 → SCIF → 720 × 480 × 60, 2:1)

Conversion / Test Sequence	CNV1	CNV2	CNV3
Flower Garden	47.41 dB	46.97 dB	44.57 dB
Susie	58.44 dB	58.07 dB	56.39 dB

Table 2 Quality of converted SCIF (Flower Garden, one frame)

one field

Terms / Conversion	Aliasing around slant lines	Double-edge noise	Line flicker
CNV1	anoying	no	not perceptable
CNV2	perceptable	yes	not perceptable
CNV3	perceptable	no	not perceptable

3. Coding efficiency

SCIF of 720 × 576 × 60, 1:1 has more than twice pixel rate compared with current local picture formats. In order to do effective communications with this SCIF, it must be cleared that this SCIF has a comparable coding efficiency with that of local picture formats.

Coding efficiency was investigated as follows. (Coding algorithm is a frame base scheme based on RM8 for all measurements.)

Format A (720 × 480 × 60, 2:1), Format B (720 × 576 × 60, 2:1) and Format C (720 × 576 × 60, 1:1 = SCIF) are compared.

Format A corresponds to a local format (NTSC).

Format B is assumed as an interlace SCIF. When we consider hardware scale and complicity, interlace format may be a candidate of SCIF. Format B is obtained from Format A by line number conversion.

Results for "Flower Garden" and "Susie" are shown in Fig.3. From Fig 3 we can see the following points.

- Format C needs 10 ~ 30% more bit rate than Format A at the same SNR.
- Format B is not necessarily advantageous over Format C for some sequence in a frame base coding.

4. Conclusion

Progressive SCIF was investigated as to converted picture quality between NTSC and SCIF and coding efficiency.

End.

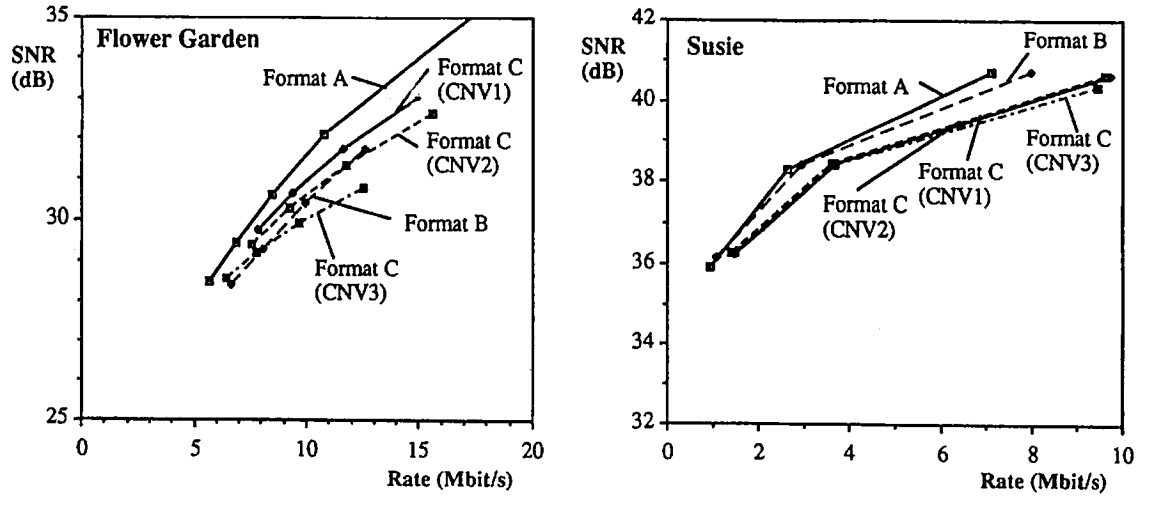

Fig. 3 Comparison of coding efficiency