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SOURCE : Japan

TITLE : Simulation results on H. 261 compatibility and SCIF

PURPOSE : Information

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1. Introduction

Simulation results on H. 261 compatibility are shown. Candidate-SCIF (Super Common Intermediate Format) pictures as well as R. 601 (525/60) pictures are coded for the upper layer with CIF pictures coded for the lower layer.

2. Simulation

Simulation is based on TM2 with Fr/Fi prediction only. Rate control of upper layer includes Step 3. Comparison of the coding performance among transmission modes in Table 1 is available in Table 2, which shows SNR for the Y signal and percentage of the compatible mode as the selected prediction mode in the upper layer. SNR of SIF, CIF and SCIF does not include the conversion noise to and from R. 601 (525/60) format. In this simulation only the first picture in each sequence is coded in the all intra-frame mode. A D1 tape demonstration will show the coded picture quality.

3. Conclusion

In embedded mode a lower bit rate of the lower layer provides smaller SNR with the lower layer of course, but it provides larger SNR with the upper layer, and vice versa.

In this simulation the percentage of compatible mode for the prediction of upper later is rather small. However that value might be much dependent on the feature of up-sampling filters from CIF to R. 601. The SNR of the upper layer might also depend on the frame rate of the lower layer. Those need further investigation.

End.

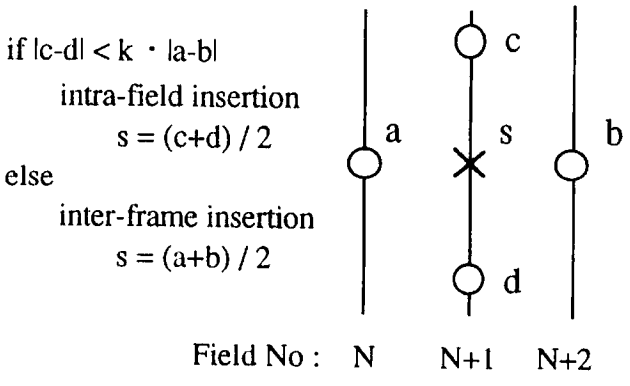

Fig. 1 Adaptive line insertion for SCIF conversion

Table 1 Coding and transmission modes for simulation

No.	Mode	Picture Format		Format Conversion Filter	
		upper layer	lower layer	upward	downward
1	Non-compatible	R. 601[#1] (525/60)	———	———	———
2	Simulcast	R. 601 (525/60)	CIF[#4]	———	———
3	Embedded 1	R. 601 (525/60)	SIF[#5]	(1/2, 1, 1/2) Core expt. G. expt. 4	(-29, 0, 88, 138, 88, 0, 29) TM2 3. 3. 2
4	Embedded 2	R. 601 (525/60)	CIF	[#6] Horizontal (1:2), Vertical (3:5)	[#7] Horizontal (2:1), Vertical (5:3)
5	Non-compatible	SCIF[#2, 3]	———	———	———
6	Simulcast	SCIF	CIF	———	———
7	Embedded	SCIF	CIF	(1/2, 1, 1/2) Core expt. G. expt. 4	(-29, 0, 88, 138, 88, 0, 29) TM2 3. 3. 2

#1 Y: 720 x 480 x 59.94, 2:1(interlace), 4:2:0

#2 Y: 720 x 576 x 59.94, 1:1(non-interlace), 4:2:0

#3 Conversion filters (SCIF ←→ R. 601 (525))

interlace ←→ non-interlace conversion: adaptive line insertion (Fig. 1 on page 1)

line number conversion: long-tap filter (AVC-80 ANNEX-2)

#4 Y: 360 x 288 x 29.97, 1:1(non-interlace), 4:2:0

#5 Y: 360 x 240 x 29.97, 1:1(non-interlace), 4:2:0

#6 Horizontal direction: (-4, 0, 16, 0, -40, 0, 156, 256, 156, 0, -40, 0, 16, 0, -4)

Vertical direction: (0, 0, 256, 0, 0) for Phase 1

(-49, 131, 197, -56, 33) for Phase 2

(22, -40, 241, 60, -27) for Phase 3

(-27, 60, 241, -40, 22) for Phase 4

(33, 56, 197, 131, -49) for Phase 5

#7 Horizontal direction: (128, 128)

Vertical direction: (-24, 76, 152, 76, -24) for Phase 1

(0, 113, 140, 35, -32) for Phase 2

(-32, 35, 140, 113, 0) for Phase 3

Table 2 Simulation Results

Total 4 Mbit/s	Sequence (60 frame)	Susie		Mobile & Calendar	
L-layer Bit Rate		1.15 Mbit/s	384 kbit/s	1.15 Mbit/s	384 kbit/s
Mode No.	frame rate	30 frame/s	10 frame/s	30 frame/s	10 frame/s
1		39.04 dB at 4Mbit/s		26.43 dB at 4Mbit/s	
2	R. 601 (525/60)	38.51 dB	38.87 dB	25.12 dB	26.00 dB
	CIF	#1 39.99 dB	#2 32.80 dB	#5 23.66 dB	#6 18.64 dB
3	R. 601 (525/60)	39.01 dB 26.6 %	38.98 dB 13.3 %	25.06 dB 7.7 %	25.93 dB 4.0 %
	SIF	38.21 dB	31.13 dB	21.68 dB	18.09 dB
4	R. 601 (525/60)	38.88 dB 19.2 %	38.94 dB 10.5 %	25.03 dB 6.4 %	25.92 dB 3.3 %
	CIF	same as #1	same as #2	same as #5	same as #6
5	R. 601 (525/60)	39.70 dB at 4Mbit/s		24.90 dB at 4Mbit/s	
	SCIF	39.87 dB at 4Mbit/s		25.32 dB at 4Mbit/s	
6	R. 601 (525/60)	38.57 dB	39.42 dB	24.14 dB	24.66 dB
	SCIF	38.77 dB	39.59 dB	24.60 dB	25.10 dB
	CIF	#3 38.34 dB	#4 30.87 dB	#7 22.22 dB	#8 17.17 dB
7	R. 601 (525/60)	39.00 dB	39.38 dB	24.09 dB	24.55 dB
	SCIF	39.19 dB 12.1 %	39.56 dB 5.6 %	24.54 dB 4.7 %	24.99 dB 3.1 %
	CIF	same as #3	same as #4	same as #7	same as #8