CCITT SGXV
Specialists Group on Coding
for Visual Telephony

Doc. No. #489
March 89, Oslo

Title: Computer Implementation of Reference Model 7, and evaluation of results.

Source: AT&T

Introduction

We have implemented Doc. 446 version of Reference Model 7 (RM7), and are currently using it to study various trade-offs. Computer simulations results have been produced for test sequences 'Claire' and 'Salesman', coded at 64 Kbits/s (q=1).

Results

Results of a study comparing tradeoffs in spatio-temporal artifacts using 'Claire' sequence are provided in the accompanying tables. The study shows that even though 10 Hz seems to be the near optimum frame-rate for Claire sequence, spatial artifacts are only very-slightly higher at 15 Hz. Coding 'Claire' at 7.5 Hz as compared to 10 Hz frame-rate, provides hardly any improvements in spatial artifacts. At 30 Hz frame-rate degradation due to spatial-artifacts is distinct as compared to that at 15 Hz, and is clearly objectionable.

Conclusion

RM7 seems robust enough to code low-activity sequences over wide-range of frame-rates. In particular, test-sequence 'Claire' can be coded at increased temporal resolution of 15 Hz instead of 10 Hz, with hardly noticeable increase in spatial artifacts.

STATISTICS: RM7 (CIF)
SEQUENCE: Claire
CODED TRACKS: 25 & 34

INSTITUTE: AT&T
DATE: Mar 3, 1989
FRAME RATE: 7.5 & 10 Hz

ITEM			Mean seq. (7.5 Hz)	Mean seq. (10 Hz)
1. RMS for luminance			3.22	3.23
2. SNR for luminance for chrominance (u) for chrominance (v)			37.99 38.70 41.44	37.96 38.55 41.15
3. Mean value of step size			20.20	19.88
4. Mean value of the number of non-zero coefficients				
5. Mean value of the number of zeros before the last NZ-coefficient				
6. Block type of MACRO	FIXED CODED MC FIXED MC CODED INTRA		239 34 23 99 0	265 32 20 79 0
7. Block type of Y	FIXED CODED MC FIXED MC CODED INTRA		1228 132 96 127 0	1280 127 80 97 0
8. Block type of UV	FIXED CODED MC FIXED MC CODED INTRA		653 44 70 24 0	673 44 59 16 0
9. Number of bits	Macro attributes		680	589
	End of block		1300	1102
	Motion vectors		417	358
	Coefficients	Y U V	4858 362 260	3499 208 162
		sub-tot	5480	3869
	Total		7877	5917

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STATISTICS: RM7 (CIF)
SEQUENCE: Claire
CODED TRACKS: 50 & 100

INSTITUTE: AT&T
DATE: Mar 3, 1989
FRAME RATE: 15 & 30 Hz

ITEM			Mean seq. (15 Hz)	Mean seq. (30 Hz)
1. RMS for luminance			3.53	4.10
2. SNR for luminance for chrominance (u) for chrominance (v)			37.19 37.98 40.61	35.89 37.04 39.25
3. Mean value of step size			24.27	33.32
4. Mean value of the number of non-zero coefficients				
5. Mean value of the number of zeros before the last NZ-coefficient				
6. Block type of MACRO	FIXED CODED MC FIXED MC CODED INTRA		295 22 17 62 0	331 10 14 41 0
7. Block type of Y	FIXED CODED MC FIXED MC CODED INTRA		1346 75 84 78 0	1439 25 72 48 0
8. Block type of UV	FIXED CODED MC FIXED MC CODED INTRA		703 22 57 10 0	739 6 43 4 0
9. Number of bits	Macro attributes		485	349
	End of block		775	393
	Motion vectors		263	154
	Coefficients	Y U V	1867 95 85	646 26 27
		sub-tot	2043	699
	Total		3566	1595