

Working Party XV/1
Specialists Group on Coding for Visual Telephony

SOURCE: JAPAN
TITLE: Simulation results for Doc.#384 & #385

1. Introduction

At the last meeting in Paris, there were two ideas concerning coding control implied from FRG (Document #384 and #385). These proposals are very important, because they are also concerned with video multiplex and flexible hardware specification. This document reports results of two simulations carried out to test the performance of these two coding control method.

2. The two proposed methods

These two proposed methods will be simply explained.

In Doc.#384, the quantization step size can be set up at each macro block by QUANT2 shown in Doc.#373. The proposal is to use TYPE3 to show if the quantization step size is set by QUANT2 or not. For this purpose, an example of a set of new TYPE3 codewords are also shown in the document.

In Doc.#385, a new construction for the GOB has been proposed. In this construction, GOB is to be made from 3 lines of 11 macro blocks and a picture is made from 12 GOBs (in RM6, GOB is made from a line of 22 macro blocks and a picture is made from 18 GOBs).

3. Simulation

Two simulations have been carried out to test the performance of these proposed methods. The relationship between buffer contents and the quantization step size was the same as that of RM6 for both simulations. For the Doc.#384 simulation, QUANT2 was sent only when the quantization step size determined from the buffer content was changed.

The simulation results for Doc.#384 is shown in Table 1 and the results for Doc.#385 is shown in Table 2. The performance of RM6 is shown in Table 3 for comparison.

The decoded image quality can also be shown by VTR demonstration for both proposals.

These results indicate that:

- (1) The mean SNR for these two proposed methods are almost the same as that for RM6.
- (2) The difference between the decoded images of RM6 and these two methods is not significant (there seems to be no special distortion for each method).

4. Conclusion

It has been found that the mean SNR for these two proposed

methods are almost the same as that for RM6. Furthermore, the image quality is almost the same. These results show that the influence of setting the quantization step size interval is small.

On the other hand, there should be a good coding control method for further study by setting the quantization step size not only by the buffer content.

Considering these points, it is believed that the specification for the flexible hardware should be decided so as to make it possible to set the quantization step size at any timing we want. In this respect, the definition of the nQ TYPE3 is very useful.

END.

Table 1

STATISTICS RM6 mean whole seq.
SEQUENCE :
MODIFICATION : Q alloc. by TYPE3

INSTITUTE JAPAN
DATE:DEC. 1988

FRAME RATE :10Hz

ITEM		Salesman	Claire	
1.RMS for luminance		7.33	3.15	
2.SNR for luminance		30.94dB	38.22dB	
for chrominance (U)		38.19dB	38.93dB	
for chrominance (V)		38.85dB	42.06dB	
3.Mean value of step size		27.1	18.9	
4.Mean value of the number of non-zero coefficients		2.5	2.8	
5.Mean value of the number of zeroes before the last NZ-coefficient		7.8	5.3	
6.Block type of MACRO	FIXED	259.1	276.5	
	CODED MC	35.7	46.7	
	FIXED MC	6.9	6.0	
	CODED	92.7	66.6	
	INTRA	1.7	0.1	
7.Block type of Y	FIXED	1262.4	1268.6	
	CODED MC	88.3	124.0	
	FIXED MC	82.0	87.2	
	CODED	151.3	104.3	
8.Block type of UV	FIXED	777.5	755.8	
	CODED	14.5	36.2	
9. Number of bits	Macro attributes		1240.2	1146.7
	End of block		769.5	754.7
	Motion vectors		284.2	310.3
	Coefficients	Y	3614.1	3550.5
		U	45.7	168.8
		V	34.3	75.8
		Total	3694.2	3795.1
	Total		6001.2	6007.8

Table 2

STATISTICS RM6 mean whole seq.
SEQUENCE :
MODIFICATION : 12G08

INSTITUTE JAPAN
DATE: DEC. 1988

FRAME RATE : 10Hz

ITEM		Salesman	Claire	
1. RMS for luminance		7.14	3.17	
2. SNR for luminance		31.19dB	38.20dB	
for chrominance (U)		38.32dB	39.01dB	
for chrominance (V)		39.22dB	42.25dB	
3. Mean value of step size		27.9	19.7	
4. Mean value of the number of non-zero coefficients		2.7	3.0	
5. Mean value of the number of zeroes before the last NZ-coefficient		8.6	5.5	
6. Block type of MACRO	FIXED	266.8	279.0	
	CODED MC	35.4	46.0	
	FIXED MC	7.4	7.3	
	CODED	84.9	63.7	
	INTRA	1.7	0.1	
7. Block type of Y	FIXED	1267.0	1268.3	
	CODED MC	87.5	123.5	
	FIXED MC	83.6	89.6	
	CODED	146.9	102.6	
8. Block type of UV	FIXED	775.7	755.7	
	CODED	16.3	36.3	
9. Number of bits	Macro attributes		899.9	843.4
	End of block		742.4	740.3
	Motion vectors		286.6	335.6
	Coefficients	Y	3844.0	3722.0
		U	68.2	185.3
		V	57.7	83.4
		Total	3969.9	3990.7
	Total		5912.3	5911.1

Table 3

STATISTICS RM6 mean whole seq.
 SEQUENCE :
 MODIFICATION : NONE

INSTITUTE JAPAN
 DATE:DEC. 1988

FRAME RATE :10Hz

ITEM		Salesman	Claire	
1.RMS for luminance		7.19	3.16	
2.SNR for luminance		31.11dB	38.20dB	
for chrominance (U)		38.43dB	38.99dB	
for chrominance (V)		39.16dB	42.18dB	
3.Mean value of step size		27.0	19.0	
4.Mean value of the number of non-zero coefficients		2.6	2.9	
5.Mean value of the number of zeroes before the last NZ-coefficient		8.2	5.4	
6. Block type of MACRO	FIXED	261.7	277.0	
	CODED MC	35.4	46.7	
	FIXED MC	6.9	6.3	
	CODED	90.9	65.9	
	INTRA	1.5	0.1	
7. Block type of Y	FIXED	1261.3	1267.6	
	CODED MC	88.7	124.7	
	FIXED MC	80.5	87.3	
	CODED	153.9	104.5	
8. Block type of UV	FIXED	777.5	754.9	
	CODED	14.5	37.1	
9. Number of bits	Macro attributes		946.1	868.2
	End of block		768.7	755.7
	Motion vectors		282.9	312.2
	Coefficients	Y	3829.2	3707.6
		U	41.6	183.0
		V	30.4	84.0
		Total	3901.2	3974.6
	Total		5911.1	5911.5