CCITT SG XV — Document # 227

Working Party XV/1

Specialist Group on Coding for Visual Telephony — June 1987

Source : NTT, KDD, NEC and FUJITSU

Title : PROGRESS IN IMPLEMENTATION OF FLEXIBLE HARDWARE

In Japan, two independent implementation of frexible hardware codecs are presently being carried out. One of these will almost be perfected by the end of June, (hopefully,) including input/output parts, coding/decoding parts and transmission circuit interfaces. And we are at the stage being able to evaluate decoded pictures at the local decoder output on real time. We are now debugging various parts of the equipment.

The other is now under development aiming at the completion in this autumn.

Some information related to the former codec and results of coding experiments based on this codec are described in the annex.

Annex to Doc. # 227

1. SPECIFICATION OF IMPLEMENTED FLEXIBLE HARDWARE

The flexible hardware (FH) described in this annex is completely based on the flexible hardware specification (Doc #182 and Doc. #216R, Annex 3), which was agreed till and at the 8th San Jose Meeting held in March. Other items, such as demand refresh and variable block size processing, can also be tested. Insofar as concerning non-compatibility items which are not specified, operation is largely modelled on that of RM4. But different methods are adopted in several parts. Table 1 summarizes the differences between the Japanese flexible hardware and RM4. For example, experiments of this codec are now carried out based on frame unit feed back or feed forward control. Moreover, control based on GOB unit can also be tested.

2. EXPERIMENTAL RESULTS (Temporary Report)

The decoded picture signal from the local decoder output was recorded and will be demonstrated by a VTR. The experiments were carried out using frame unit feed back control without variable block size processing. The values of some coding parameters had previously been set when this codec was debugged, and are different from the parameters to be used in the initial compatibility check (Doc. #217).

The pictures which will be shown were produced on May 28. There may be included some unintentional errors in the details.

Table 1. COMPARISON BETWEEN RM4 AND JAPANESE FLEXIBLE HARDWARE

Item		RM4	Japanese FH
1.Sig./insig. decision		Depends on transform and quantization results	Same as left. Also sum of absolute values of prediction errors.
2.Inter/intra selection		-Compares second order sum of differences -Compares interframe prediction errors and threshold values	-Compares sum of absolute values of differences -Same as left
3.Scene cut handling		-Treated as known -No. of bits in scene cut : Equivalent to 2 ordinaly coded pictures.	-Decision by interframe differences -Same as left, or uses no. of bits required by defined parameters.
4.*Quantization	Intra D.C. part	9 bit linear PCM	Same as left
	Inter D.C. part	Straight linear + dead zone	Same as left, or quantization can also be carried out with smaller step sizes
	Inter A.C. part	(dead zone = 1.0 * step size)	Same as left
	Y/C	Same	Same
5. Control of quantization characteristics		GOB units	Same as left, or frame units
6. Determination of transmission coefficient		Send all	Same as left, or discard coef. in higher sequencies

Table 1. (Continued)

Item		RM4	Japanese FH
7.*Classification		4-ways	4-ways + 2-ways (variable block size)
8.*VLC for DCT coefficients		PCM and one 2-D VLC	PCM and one 1-D VLC
9.*Table contents		Scanning sequences	Same as left
10. MC	Detection method	-3 steps method -Forced off condition : Fig. 2 Doc. #107	-3 steps method + previous block control : sum of absolute values of interframe differences
	*Vector type	Integer vector	Same as left
	*Color signal	No MC	Same as left
	*Range	± 7 pels * ± 7 lines	± 15 pels * ± 15 lines
	*Coding	-Absolute value -Fixed length code	-Differencial vector -VLC
11.*Loop filter		-size : 8 * 8 -Choose smaller sum of absolute values	-Same as left -Control by motion vector
12. Coding control		Control in GOB units	Same as left, or control of frame units
13. Prefilter Postfilter		None None	Temporal filter Same as left
14.*Block attribute		Run length + VLC	Same as left
15. Frame dropping rate		Treated as given	Determined by coding control
16. Delay time		200 ms + α	180 - 200 ms (in normal operation)

(* denotes compatibility item.)