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

SOURCE : JAPAN
TITLE : Simulation of a Vector Quantization and Some Comments on Evaluation of Coding Schemes

1. Introduction

In this document, the results of coding simulation for the current standard sequences using a vector quantization (VQ) are shown. Further arrangements are required adjusting to the simulation condition.

Some comments are described about the evaluation of the coding schemes.

2. Vector Quantization scheme

2.1 Scheme

The block diagram of the encoder is shown in the Figure 1.

2.2 Specifications

The specifications are shown in the Table 1.

2.3 Simulation

The simulation results of the first trial are shown in the Graph 1.

3. Further study on Vector Quantization

On MC+VQ coding system, followings are necessary to be studied.

① larger block size of VQ
② fixed/dynamic codebook structure
③ Sub-band VQ method
④ motion adaptive coding control
⑤ image processing procedure
⑥ total tuning for 64 kbits/s etc.

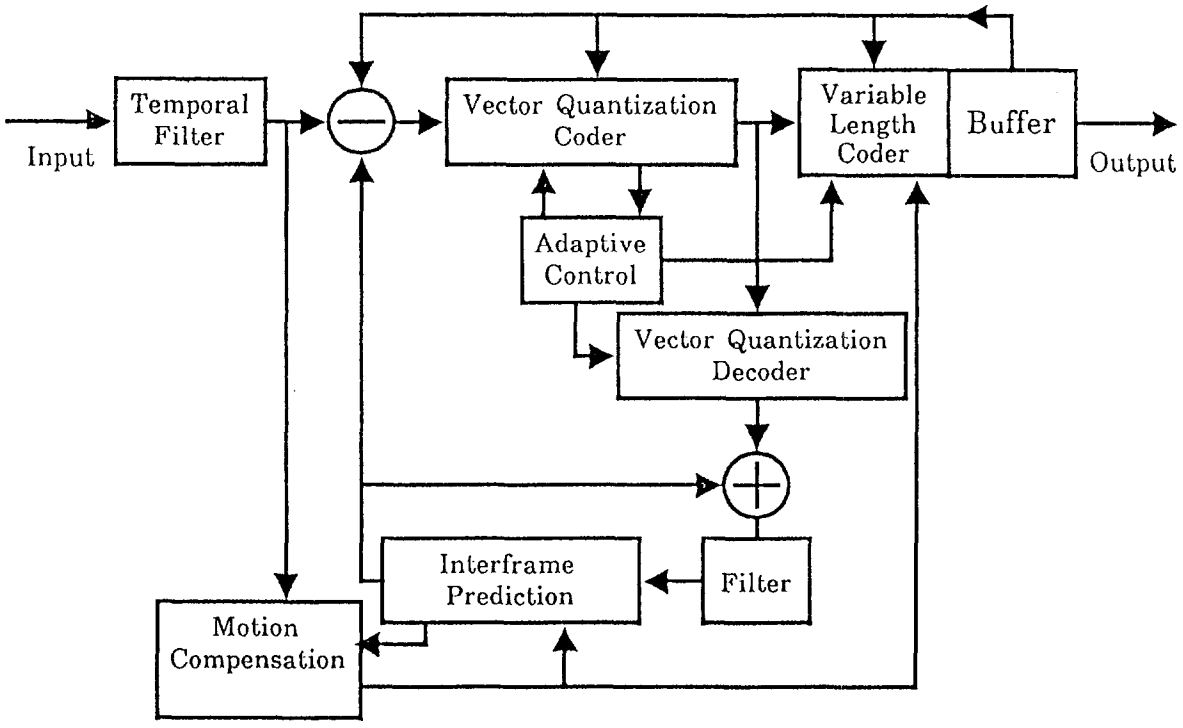
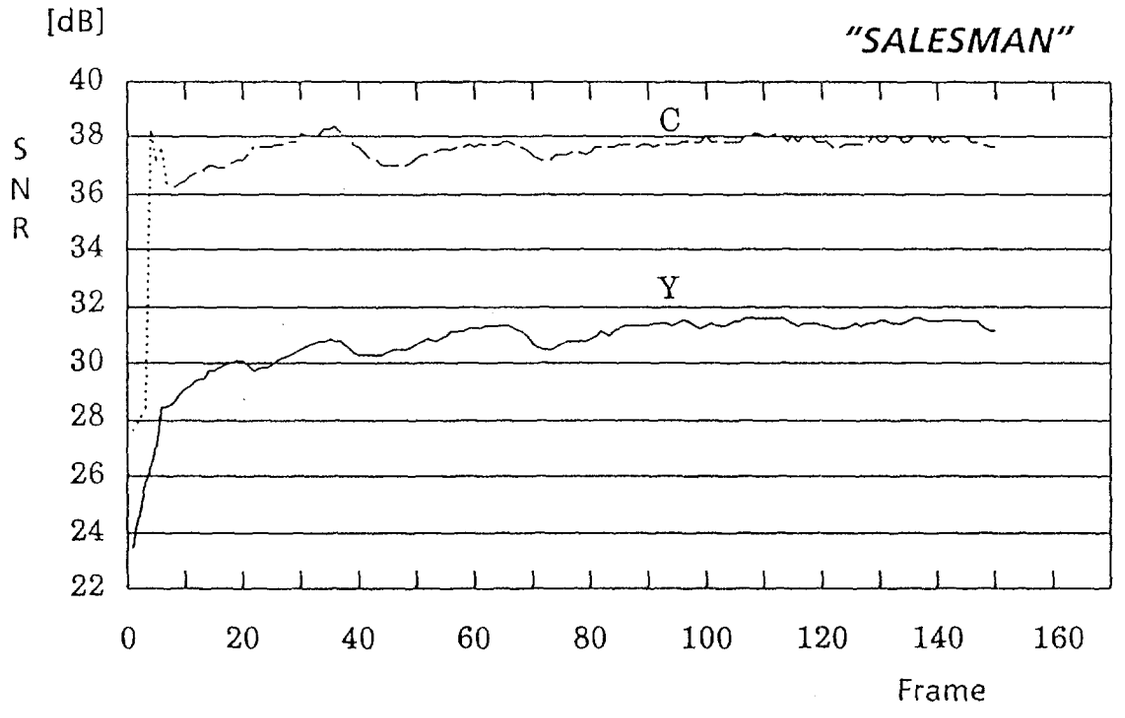


Figure 1 Block diagram of encoder

Table 1 Specifications

Item		Specification
Motion compensation	Block size	16 (H) × 16 (V) pels
	Search area	± 7 (H) × ± 7 (V) pels
Vector quantization	Scheme	Mean separated inner-product VQ
	Block size	4 (H) × 4 (V) pels
	Codebook size	Maximum 12 bits
	Search scheme	Adaptive tree search
	Coding of mean	DPCM
	Quantization of gain	Uniform quantization
	Information for conditional replenishment	Pattern coding
Coding parameters		Controlled each GOB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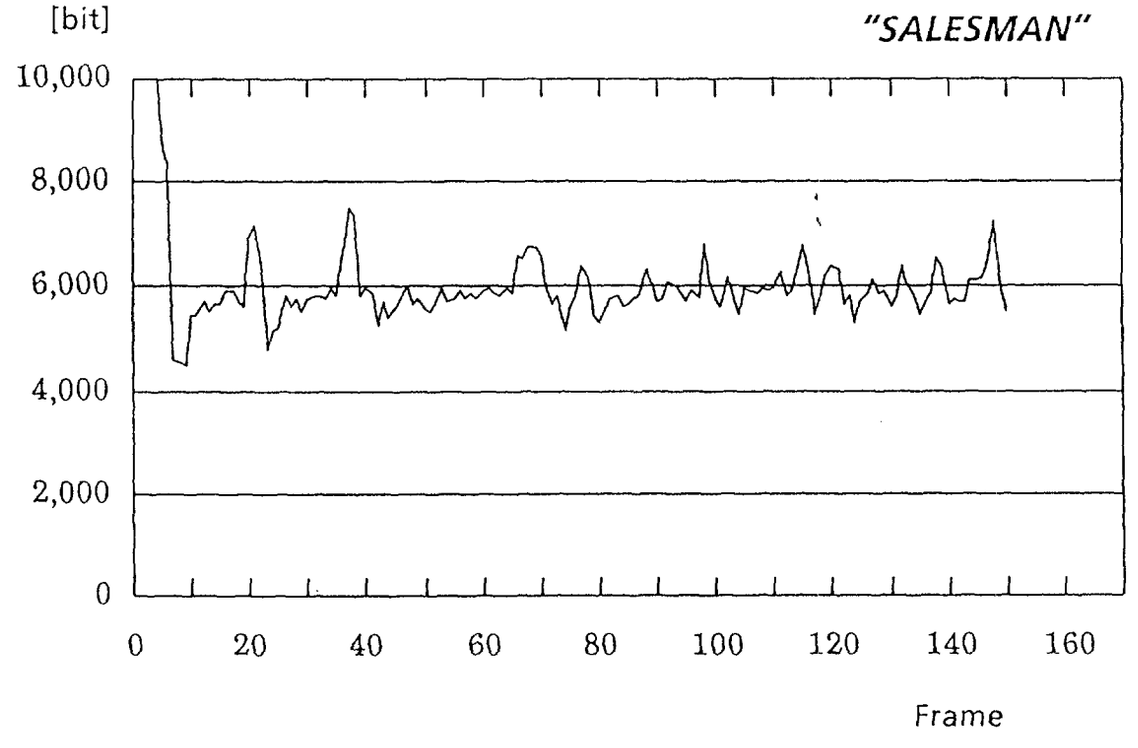
"SALESMAN"
S
N
R
40
38
36
34
32
30
28
26
24
22
C
Y
0
20
40
60
80
100
120
140
160
Frame


[bit]
"SALESMAN"
10,000
8,000
6,000
4,000
2,000
0
0
20
40
60
80
100
120
140
160
Frame

Graph 1

4. Comments on Evaluation of coding schemes

4.1 Annoying block-noise can be observed at a sequence which has rather active area on a complicated background like SALESMAN through the current RM5 or RM5 based scheme.

4.2 The stability of picture quality and respective noise depending on the coding scheme should be verified for RM5 and other coding schemes against severe sequences so that the frame-skip is inevitable. The relation between the block-noise and the variable frame rate should be certified.

4.3 Considering the practical application, the complexity of coding schemes should be also discussed.

5. Conclusion

5.1 We should discuss how to evaluate the robustness and the complexity of coding schemes. We suggest that a study on the evaluation method and test items of coding schemes considering practical use is initiated.

5.2 More simple and powerful coding algorithm may be necessary to be developed for the videophone coder.