CCITT
QUESTION 4/XV
Specialist group on
coding for visual telephony
S/19/HP/7

Document n° 94

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Title : VARIABLE BLOCKSIZE HYBRID CODING SCHEME

Source : France

In order to reduce the "mosquito" effect and take into account that, often, only few pels are moving in a block (for instance along the edge of a person), we propose the use of a variable blocksize hybrid coding schewe.

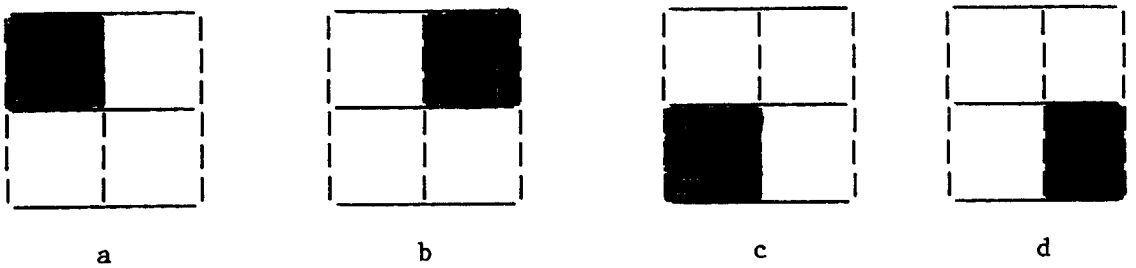
The following description concerns 16 x 16 and 8 x 8, but it can be applied to 12 x 12 and 6 x 6, 8 x 8 and 4 x 4 and also to 16 x 16, 8 x 8 and 4 x 4 at the same time.

Motion detection

The new scheme leads to perform motion detection in the pel domain. As far as 16 x 16 and 8 x 8 are concerned, motion detection is carried out on 8 x 8 blocks according to a 16 x 16 structure.

Several types of blocks appear :

1



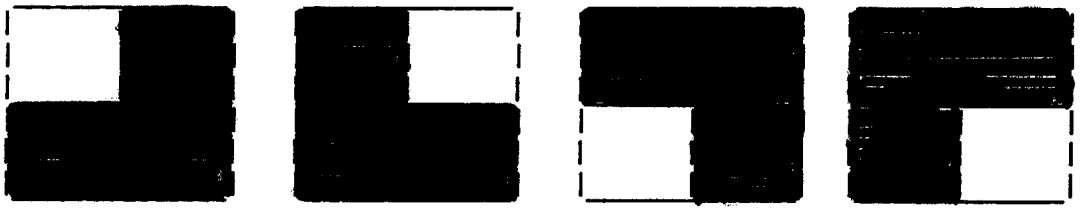
a b c d

2

a b c d

3

4



5

In dark : the moving part

To reduce the complexity, we suggest to consider blocks "3" and "4" as blocks "5". It then remains three types of blocks "1", "2" and "5".

Motion estimation

Motion estimation is done on blocks "1", "2" and "5". It means that motion estimation is performed on 8 x 8 blocks, 8 x 16 blocks, 16 x 8 blocks and 16 x 16 blocks.

Transforms

Before applying the transform, a new comparison is carried out between new and compensated blocks. For example, a so called block "5" may become "2" or "1" or a perfectly compensated block. It may also remain a block of type "5".

The transform is there applied on four kinds of blocks : 8 x 8, 8 x 16, 16 x 8 and 16 x 16. Two one dimensional transforms 8 and 16 may be used, or only one (16) according to document Sim/86/8 , Hardware /86/8 "The use of a N-DCT device to perform a $\frac{N}{2}$ - DCT" and situation B' (or B) depicted in this document.

Video multiplex

We need to add one more attribute :

1 : normal block (ype "5")
0 : subdivided block (type "1" or "2")

In this latter case, extra bits are necessary to pricisely define which block among eight ("1" + "2") is transmitted, and which block is concerned by the displacement vector :

1 : type "2"
0 : type "1"

00 : a
01 : b for both type "2" and "1"
10 : c
11 : d

In case of type "2"

1 : motion vector concerns type "2"
0 : " " " " "5"

In case of type "1"

00 : motion vector concerns type "1"
01 : " " " " "2"
10 : " " " " "
11 : " " " " "5"

Fig. 1 and 2 are given as examples of such a coding scheme.

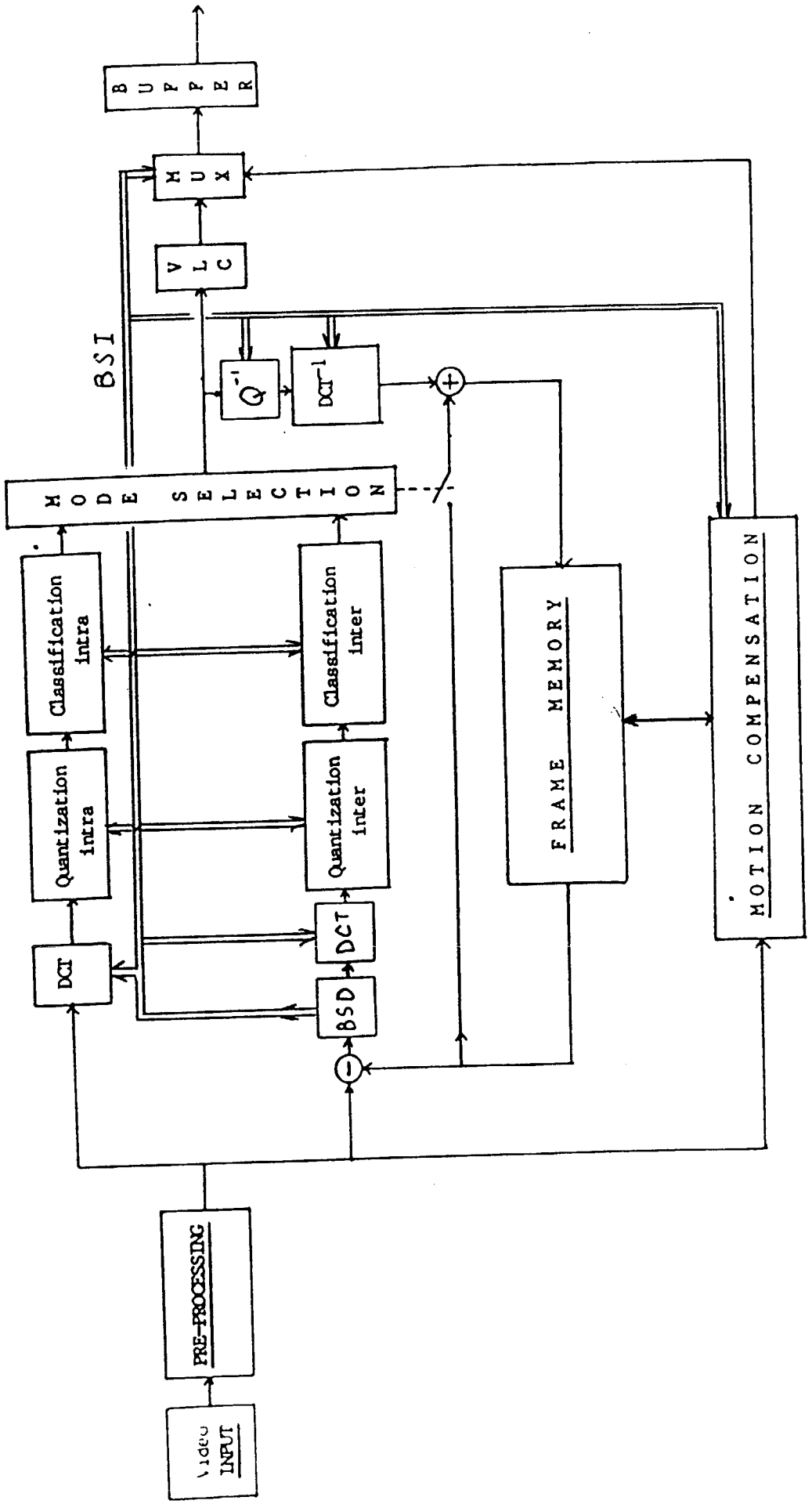


Fig. 1 : Hybrid codec structure with variable blocksize

BSD : Block size decision
BSI : Block size information

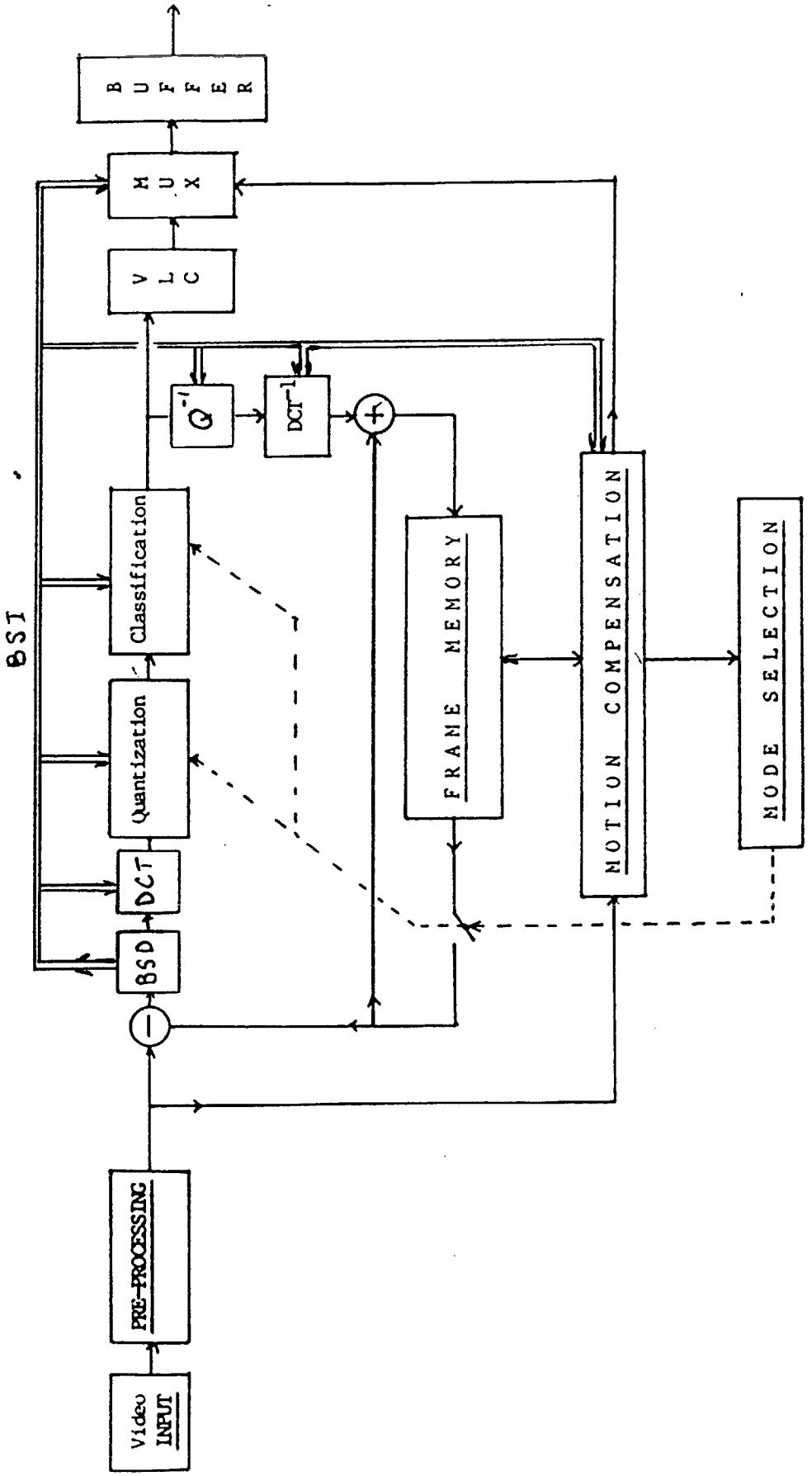


Fig. 2 : Hybrid codec structure with variable blocksize

BSD : Block size decision
BSI : Block size information