Method for video signal encoding

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☑ Claim(s) : paged ...6.... to paged ...7.....
☑ Drawing(s) : paged ...1/2... to paged ...2/2.....
☐ Abstract : paged ..... to paged .....
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The invention relates to a method for video signal encoding.

Prior Art

DE 36 42 664 specifies a transformation circuit with whose aid an 8*8 or 2*(4*8) DCT-transformation can be carried out (DCT = discrete cosine transformation). It is possible to switch over between an 8*8 and a 2*(4*8) DCT by selection of the logic level of a switching line.

Invention

The invention is based on the object of specifying a method for video encoding by means of a codec which is suitable for progressively scanned video signals and in which input signals which are scanned in interlace can also be processed. This object is achieved by the method according to the invention specified in Claim 1.

In principle, the method according to the invention consists in that, in the case of a hybrid encoder which can process the blocks of progressively scanned pixels, line sections of blocks of interlace-scanned pixels are arranged, before the encoding, within in each case two blocks, which are located vertically one above the other, such that only line sections from one field of the video signals are contained within each of these blocks.

In this case, movement in the frame content is determined and, in the event of a dynamic frame content, the line sections are resorted within the blocks which are located one above the other.

Advantageous developments of the method according to the invention result from the associated subclaims.

In the case of a method for hybrid encoding of video signals proposed by ISO-MPEG (ISO, International Organization for Standardization, MPEG: Motion Picture

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Expert Group) under the Standard Proposal Number ISO 11172, progressively scanned input signals are processed block by block using a DCT, blocks of 8*8 pixels in each case being encoded and decoded, and a sequence of inter-frame-encoded frames is passed through at regular intervals by intraframe-encoded frames. In this case, the encoder effectiveness is also based on the relatively high correlation between pixels within such blocks. If it is now also desired to process source signals scanned in interlace using such a hybrid encoder, the encoder effectiveness drops in the event of a dynamic frame content and the data rate required for encoding rises, because every other line in each case originates from a block to [sic] different movement phases and, in consequence, the correlation between pixels within such a block falls. In the case of a static frame content, the encoder effectiveness is, in contrast, maintained.

In the event of a dynamic frame content, the lines which belong to a first field from two 8*8 pixel blocks which are located one above the other are now combined to form a first 8*8 block, and the lines which belong to the corresponding second field from these two 8*8 pixel blocks which are located one above the other are combined to form a second 8*8 block and are supplied to the hybrid encoder in this form.

As a result of the reorganization of the input signals, in the case of interlace input signals, switching over need not be carried out in the hybrid encoder between an 8*8 and 2*(4*8) DCT-transformation as in DE 36 42 664, but an 8*8 DCT can also advantageously be carried out in the case of a dynamic frame content.

Movement detection is used to determine whether the frame content is static or dynamic and accordingly to carry out resorting or readdressing of the lines. This information can in this case be added to the encoded data of the respective block by means of one bit per block or double block.

During the decoding, the corresponding lines are changed back into their original sequence, the movement

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information being evaluated.

In the case of the abovementioned Standard Proposal, four luminance pixel blocks which are arranged in a square are in each case combined to form a macro-block. Two of those blocks of such a macro-block which are located one above the other in each case advantageously belong together in the sense described above. In this case, one bit per macro-block can also indicate the resorting.

Drawings

Exemplary embodiments of the invention are described with reference to the drawings, in which:

Fig. 1 shows the line arrangement within blocks in the case of a static and dynamic frame content;

Fig. 2 shows a block diagram, having additional circuits according to the invention, to form a codec.

Exemplary Embodiments

Fig. 1a and Fig. 1b each show two blocks, which are located one above the other, of luminance or chrominance pixels in the x-y plane. In order to simplify the illustration, the blocks each have a size of 4*4 pixels instead of the size of 8*8 pixels. Instead of 8*8, the blocks can in general also have a size of (2*n)*(2*m), where n=1,2,3..., m=1,2,3,... . The two-digit numbers in each case mark the physical position of a pixel. The first digit in these numbers represents the block number, and the second the line number within a block.

Those pixels of the known hybrid encoder which are to be encoded and decoded are arranged in progressively scanned form in accordance with Fig. 1a. This likewise applies to pixels having a static frame content in the case of interlace-scanned pixels. In the case of a dynamic frame content, the lines of in each case two blocks which are located one above the other are interchanged in accordance with Fig. 1b before encoding and

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are arranged in accordance with Fig. 1a again after decoding.

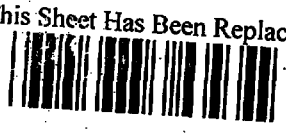
Fig. 2 shows a hybrid encoder 25 in accordance with the abovementioned Standard Proposal. Interlace-scanned video signals from frame n are supplied to the input 21 and pass into a frame memory 22 and a movement detector 24. Data (two blocks which are located one above the other) which are required by the movement detector 24 from frame n-1, and the line sections of the two blocks which are in each case involved are read into a block memory 23 from the frame memory 22, from which block memory 23 the hybrid encoder can in each case pick off 8*8 blocks. In the block memory 23, the pixels are buffer-stored in accordance with Fig. 1a in the case of a static frame content, and in accordance with Fig. 1b in the case of a dynamic frame content.

The movement detector can be implemented in accordance with various known methods. For example, the absolute-value differences between pixels from blocks in the same physical position from frame n and frame n-1 can be formed for each block or double block to be encoded. Alternatively, movement vectors formed by the hybrid encoder 25 (for example in each case for two blocks which are located one above the other) can be used instead of the movement detector. If the respective sum of these absolute-value differences and/or the magnitude of the corresponding movement vector for this block or these blocks exceeds a predetermined threshold (that is to say a dynamic frame content is present), the pixels are buffer-stored in the block memory 23 in accordance with Fig. 1b, and if not they are buffer-stored in the block memory 23 in accordance with Fig. 1a.

The resorting can be carried out in accordance with the following instruction:

```
DO y=1,N/2
DO x=1,N
    Bout1(x,y) = Bin1(x,2*y-1)
    Bout1(x,y) = Bin1(x,2*y)
    ENDDO
```

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```
ENDDO
DO y=1,N/2
      DO x=1,N
      B_out1(x,y+N/2) = B_in2(x,2*y-1)
      B_out1(x,y+N/2) = B_in2(x,2*y)
      ENDDO
ENDDO,
```

B_{in1} being that block which is locally located higher, and N being an even number.

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Patent Claims

1. Method for video signal encoding using a hybrid encoder (25) which can process blocks of progressively sampled pixels, characterized in that, before the encoding, line sections of blocks of interlace-scanned pixels (11-14, 21-24) are arranged within in each case two blocks, which are located vertically one above the other, such that only line sections from one field of the video signals are obtained within each of these blocks.

2. Method according to Claim 1, characterized in that movement in the frame content is determined and the line sections in the case of a dynamic frame content are resorted within the blocks which are located one above the other.

3. Method according to Claim 1 or 2, characterized in that information is added to the encoded video signals for each pair of blocks which are located one above the other, which information indicates whether resorting of line sections has taken place.

4. Method according to Claim 3, characterized in that, after the decoding, the line sections are arranged in their original sequence again, the information which was added to the encoded video signals being evaluated.

5. Method according to one or more of Claims 1 to 4, characterized in that the blocks have the size of 8*8 pixels.

6. Method according to Claim 5, characterized in that four blocks having a size of 8*8 luminance pixels in square form are in each case combined, the blocks, which are located one above the other, in each case being arranged within these combined blocks.

7. Method according to one or more of Claims 3 to 6, characterized in that the information which is added to the encoded video signals in each case applies jointly to four combined blocks.

8. Method according to one or more of Claims 1 to 7, characterized in that the resorting of the line sections is controlled by the output signal of a movement detector

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(24) and/or by movement vectors which are generated in the hybrid encoder (25).

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11	11	11	11
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11	11	11	11
13	13	13	13
21	21	21	21
23	23	23	23

21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24

a

12	12	12	12
14	14	14	14
22	22	22	22
24	24	24	24

b

FIG.1

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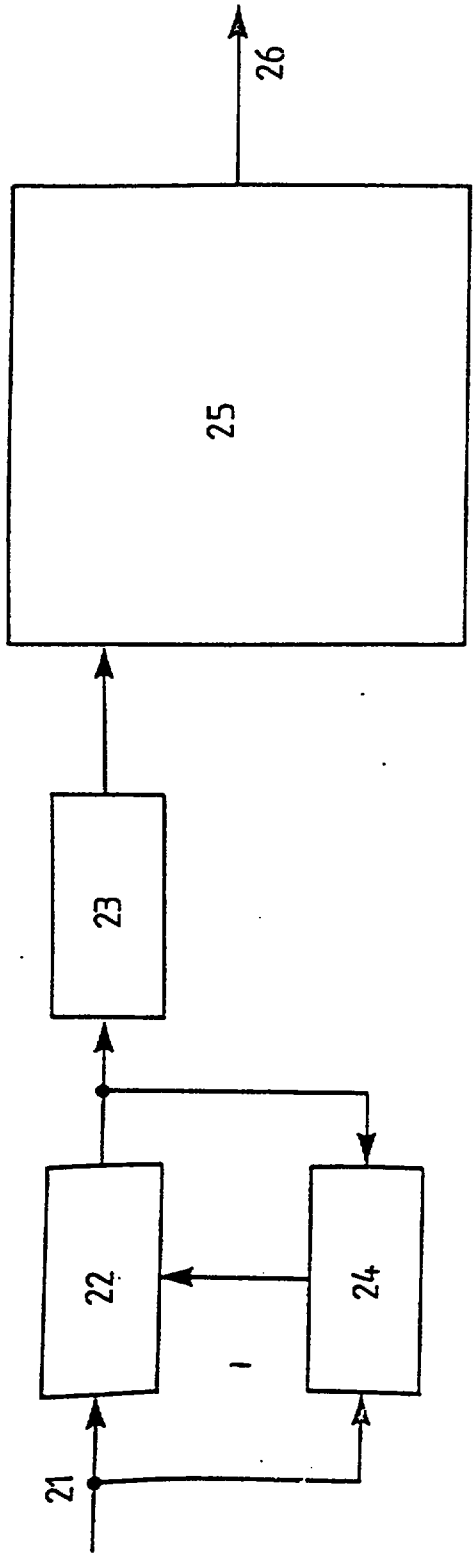


FIG.2

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☑ Claim(s) : paged ..6... to paged 7
☑ Drawing(s) : paged ..1/2.. to paged 2
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Method for video signal encoding

The invention relates to a method for video signal encoding.

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Prior Art

DE 36 42 664 specifies a transformation circuit with whose aid an 8*8 or 2*(4*8) DCT-transformation can be carried out (DCT = discrete cosine transformation). It is possible to switch over between an 8*8 and a 2*(4*8) DCT by selection of the logic level of a switching line.

Invention

The invention is based on the object of specifying a method for video encoding by means of a codec which is suitable for progressively scanned video signals and in which input signals which are scanned in interlace can also be processed. This object is achieved by the method according to the invention specified in Claim 1.

In principle, the method according to the invention consists in that, in the case of a hybrid encoder which can process the blocks of progressively scanned pixels, line sections of blocks of interlace-scanned pixels are arranged, before the encoding, within in each case two blocks, which are located vertically one above the other, such that only line sections from one field of the video signals are contained within each of these blocks.

In this case, movement in the frame content is determined and, in the event of a dynamic frame content, the line sections are resorted within the blocks which are located one above the other.

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In the case of a method for hybrid encoding of video signals proposed by ISO-MPEG (ISO, International Organization for Standardization, MPEG: Motion Picture

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Expert Group) under the Standard Proposal Number ISO 11172, progressively scanned input signals are processed block by block using a DCT, blocks of 8*8 pixels in each case being encoded and decoded, and a sequence of inter-frame-encoded frames is passed through at regular intervals by intraframe-encoded frames. In this case, the encoder effectiveness is also based on the relatively high correlation between pixels within such blocks. If it is now also desired to process source signals scanned in interlace using such a hybrid encoder, the encoder effectiveness drops in the event of a dynamic frame content and the data rate required for encoding rises, because every other line in each case originates from a block to [sic] different movement phases and, in consequence, the correlation between pixels within such a block falls. In the case of a static frame content, the encoder effectiveness is, in contrast, maintained.

In the event of a dynamic frame content, the lines which belong to a first field from two 8*8 pixel blocks which are located one above the other are now combined to form a first 8*8 block, and the lines which belong to the corresponding second field from these two 8*8 pixel blocks which are located one above the other are combined to form a second 8*8 block and are supplied to the hybrid encoder in this form.

As a result of the reorganization of the input signals, in the case of interlace input signals, switching over need not be carried out in the hybrid encoder between an 8*8 and 2*(4*8) DCT-transformation as in DE 36 42 664, but an 8*8 DCT can also advantageously be carried out in the case of a dynamic frame content.

Movement detection is used to determine whether the frame content is static or dynamic and accordingly to carry out resorting or readdressing of the lines. This information can in this case be added to the encoded data of the respective block by means of one bit per block or double block.

During the decoding, the corresponding lines are changed back into their original sequence, the movement

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information being evaluated.

In the case of the abovementioned Standard Proposal, four luminance pixel blocks which are arranged in a square are in each case combined to form a macro-block. Two of those blocks of such a macro-block which are located one above the other in each case advantageously belong together in the sense described above. In this case, one bit per macro-block can also indicate the resorting.

Drawings

Exemplary embodiments of the invention are described with reference to the drawings, in which:

Fig. 1 shows the line arrangement within blocks in the case of a static and dynamic frame content;

Fig. 2 shows a block diagram, having additional circuits according to the invention, to form a codec.

Exemplary Embodiments

Fig. 1a and Fig. 1b each show two blocks, which are located one above the other, of luminance or chrominance pixels in the x-y plane. In order to simplify the illustration, the blocks each have a size of 4*4 pixels instead of the size of 8*8 pixels. Instead of 8*8, the blocks can in general also have a size of (2*n)*(2*m), where n=1,2,3..., m=1,2,3,... . The two-digit numbers in each case mark the physical position of a pixel. The first digit in these numbers represents the block number, and the second the line number within a block.

Those pixels of the known hybrid encoder which are to be encoded and decoded are arranged in progressively scanned form in accordance with Fig. 1a. This likewise applies to pixels having a static frame content in the case of interlace-scanned pixels. In the case of a dynamic frame content, the lines of in each case two blocks which are located one above the other are interchanged in accordance with Fig. 1b before encoding and

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are arranged in accordance with Fig. 1a again after decoding.

Fig. 2 shows a hybrid encoder 25 in accordance with the abovementioned Standard Proposal. Interlace-scanned video signals from frame n are supplied to the input 21 and pass into a frame memory 22 and a movement detector 24. Data (two blocks which are located one above the other) which are required by the movement detector 24 from frame n-1, and the line sections of the two blocks which are in each case involved are read into a block memory 23 from the frame memory 22, from which block memory 23 the hybrid encoder can in each case pick off 8*8 blocks. In the block memory 23, the pixels are buffer-stored in accordance with Fig. 1a in the case of a static frame content, and in accordance with Fig. 1b in the case of a dynamic frame content.

The movement detector can be implemented in accordance with various known methods. For example, the absolute-value differences between pixels from blocks in the same physical position from frame n and frame n-1 can be formed for each block or double block to be encoded. Alternatively, movement vectors formed by the hybrid encoder 25 (for example in each case for two blocks which are located one above the other) can be used instead of the movement detector. If the respective sum of these absolute-value differences and/or the magnitude of the corresponding movement vector for this block or these blocks exceeds a predetermined threshold (that is to say a dynamic frame content is present), the pixels are buffer-stored in the block memory 23 in accordance with Fig. 1b, and if not they are buffer-stored in the block memory 23 in accordance with Fig. 1a.

The resorting can be carried out in accordance with the following instruction:

```
DO y=1,N/2
DO x=1,N
     Bout1(x,y) = Bin1(x,2*y-1)
     Bout1(x,y) = Bin1(x,2*y)
     ENDDO
```

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```
ENDDO
DO y=1,N/2
      DO x=1,N
      B_out1(x,y+N/2) = B_in2(x,2*y-1)
      B_out1(x,y+N/2) = B_in2(x,2*y)
      ENDDO
ENDDO,
```

B_{in1} being that block which is locally located higher, and N being an even number.

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Patent Claims

1. Method for video signal encoding using a hybrid encoder (25) which can process blocks of progressively sampled pixels, characterized in that, before the encoding, line sections of blocks of interlace-scanned pixels (11-14, 21-24) are arranged within in each case two blocks, which are located vertically one above the other, such that only line sections from one field of the video signals are obtained within each of these blocks.

2. Method according to Claim 1, characterized in that movement in the frame content is determined and the line sections in the case of a dynamic frame content are resorted within the blocks which are located one above the other.

3. Method according to Claim 1 or 2, characterized in that information is added to the encoded video signals for each pair of blocks which are located one above the other, which information indicates whether resorting of line sections has taken place.

4. Method according to Claim 3, characterized in that, after the decoding, the line sections are arranged in their original sequence again, the information which was added to the encoded video signals being evaluated.

5. Method according to one or more of Claims 1 to 4, characterized in that the blocks have the size of 8*8 pixels.

6. Method according to Claim 5, characterized in that four blocks having a size of 8*8 luminance pixels in square form are in each case combined, the blocks, which are located one above the other, in each case being arranged within these combined blocks.

7. Method according to one or more of Claims 3 to 6, characterized in that the information which is added to the encoded video signals in each case applies jointly to four combined blocks.

8. Method according to one or more of Claims 1 to 7, characterized in that the resorting of the line sections is controlled by the output signal of a movement detector

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(24) and/or by movement vectors which are generated in the hybrid encoder (25).

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METHOD FOR VIDEO SIGNAL ENCODING

ABSTRACT

Transformation circuits for carrying out an 8*8 or 2*(4*8) DCT transformation exist. Switching between a 8*8 or 2*(4*8) DCT can be carried out by suitable choice of the logical level of a connecting line. Hybrid coders for picture signals are known which process blocks of progressively scanned input signals using DCT, blocks of 8*8 pixels being coded or decoded in each case. In the case of dynamic picture contents, the lines belonging to a field are combined to form a first 8*8 block, and the lines belonging to the corresponding second field are combined to form a second 8*8 block from these two superposed 8*8 pixel blocks and fed in this form to the hybrid coder. As a result of the reorganization of the input signals, switching between an 8*8 and a 2*(4*8) DCT transformation in the hybrid coder is unnecessary for interlace input signals, but an 8*8 DCT can be advantageously carried out also for a dynamic picture content.

FIGURE 1.

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21	21	21	21
22	22	22	22
23	23	23	23
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a

12	12	12	12
14	14	14	14
22	22	22	22
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FIG.1

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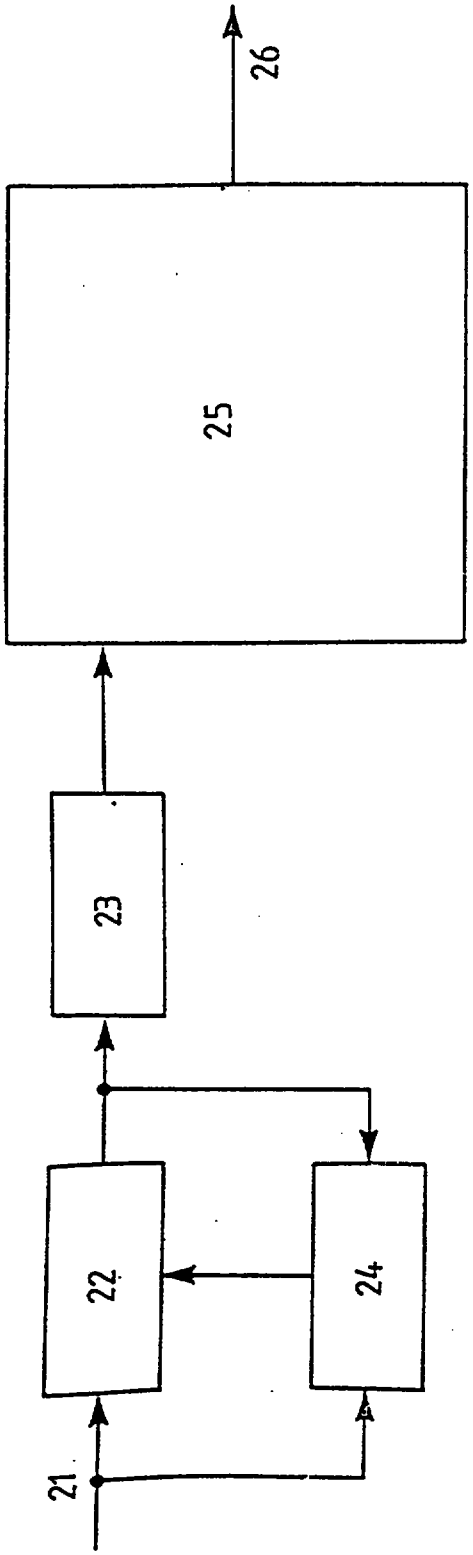


FIG. 2

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PROCESS FOR CODING PICTURE SIGNALS

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The invention relates to a method for the coding of picture signals.

State of the Art

A transformation circuit with the help of which an 8 * 8 or 2*(4*8) DCT transformation can be carried out is described in DE 36 42 664 (DCT = discrete cosine transformation). One can switch between an 8*8 and a 2*(4*8) DCT by the choice of the logical level on a control lead.

In Signal Processing of HDTV, II, Proceedings of the Third International Workshop on HDTV, Turin, 30.08.- 01.Sep. 1989, R. Kutka, `Block adaptive frame/field DCT coding decided by vertical difference test' and in Proceedings, SPIE-The International Society for Optical Engineering, Image Algorithms and Techniques, 12.-14.Feb. 1990, Santa Clara, W. Jass, `A hybrid DCT-codec with local adaptivity for the interlaced HDTV-transmission with 140 Mbit/s', dependent upon a vertical difference test within a quadratic block, the line sections before the transformation are so sorted that in the upper and lower block halves are contained only line sections from one field. If sorting occurs, each of the two block halves are handled with a non-quadratic transformation, but otherwise with a quadratic transformation.

It is known from Funkschau, Vol. 60, No. 26, 16 Dec 1988, Munich, P. Vogel, `Videobild auf der Datenleitung' (`Video images on data transmission lines') to combine four quadratic picture element blocks into a macroblock during coding.

In the two citations named at the second point, in the case of dynamic picture content within a block (e.g. 16*16 picture elements) in each case the picture elements deriving from one of the two frames are transformed with a

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special DCT (8*16). For static picture content, a normal quadratic DCT (16*16) is used. The disadvantage of this state of the art is the relatively high expense for the second special DCT.

Invention

The object of the invention is to provide a method for the coding of pictures by means of a codec suitable for progressively scanned picture signals with which interlace scanned input signals can also be processed. This object is achieved by the method in accordance with the invention defined in claim 1.

Basically, the method in accordance with the invention consists in that, before the coding with a hybrid coder which can process blocks of progressively scanned picture elements, line sections from respective blocks of interlace scanned picture elements within two blocks arranged vertically one above the other such that only line sections from one field of the picture signals are contained within each of these blocks.

Thereby, movement in the picture content is detected and the line sections are re-sorted within the blocks one above the other in the event of dynamic picture content.

The invention is based on the recognition that, even within two quadratic blocks (16*16 or, as in the description, 8*8) positioned one above the other, there is a relatively high correlation between the picture elements of a frame and that this permits a correspondingly high coding efficiency with a quadratic DCT. Under these conditions, the cost of the hardware for a re-sorting or re-addressing of lines within these two blocks is now substantially less than the cost of a special, non-quadratic DCT.

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The invention thus permits a cost-advantageous and effective 8*8 (or 16*16) DCT, independent of movement in the picture content of interlace picture signals.

Advantageous developments of the method in accordance with the invention are apparent from the appertaining appendant claims.

With a method for the hybrid coding of picture signals proposed by ISO-MPEG (ISO: International Organisation for Standardisation, MPEG: Motion Picture Expert Group) under the Standard-Proposal number ISO 11172, progressively scanned input signals are processed in blocks with a DCT whereby respective blocks of 8*8 picture elements are coded or decoded and a sequence of inter-frame coded pictures is replaced at regular intervals by intra-frame coded pictures. Thereby, the effectiveness of the coding is also based on the relatively high correlation of picture elements within such blocks. If now, one also wishes to process source signals scanned in interlace fashion with such a hybrid decoder, the effectiveness of the coding falls in the event of dynamic picture content or, the data rate required for the coding increases, because every second line derives from a block having different phases of movement and the correlation of the picture elements within such a block thereby falls. In contrast, in the event of static picture content, the effectiveness of the coding is maintained.

With a dynamic picture content, the lines pertaining to a first field from two 8*8 picture element blocks positioned one above the other are now combined into a first 8*8 block and the lines appertaining to the corresponding second field from these two 8*8 picture element blocks positioned one above the other are combined into a second 8*8 block and fed in this form to the hybrid coder.

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Due to the reorganisation of the input signals, one does not have to switch over between an 8*8 and a 2*(4*8) DCT transformation in the hybrid coder as in DE-A-36 42 664 but rather an 8*8 DCT can also be advantageously carried out even with a dynamic picture content.

With the help of a movement detector means, it is determined whether a static or dynamic picture content is present and, accordingly, a re-sorting or re-addressing of the lines is undertaken. This item of information can then be added to the coded data of the respective block by means of a bit per block or double block.

During the decoding, the corresponding lines are again arranged in the original sequence whereby the item of movement information is evaluated.

In the aforesaid Standard Proposal, four luminance picture element blocks each arranged in the shape of a square are combined into a macro block. Advantageously, two of the blocks positioned one above the other of such a macro block always form a pair in the above-mentioned sense. Thereby, one bit per macro block can also indicate the re-sorting.

Drawings

Embodiments of the invention will be described with the help of the drawings. The drawings show in:

Fig. 1 the disposition of the lines within the blocks for static and dynamic picture content;

Fig. 2 a block circuit diagram having additional circuits for a codec in accordance with the invention.

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Embodiments

Fig. 1a and Fig. 1b respectively show two blocks of luminance or chrominance picture elements positioned one above the other in the x-y plane. For simplicity of illustration, the blocks each have a size of 4*4 picture elements instead of a size of 8*8 picture elements. In general, the blocks could also have a size of (2*n)*(2*m) where n = 1, 2, 3,..., m = 1, 2, 3,..., instead of 8*8. The two digit numbers respectively mark the spatial position of a picture element. The first digit of this number represents the block number, the second, the line number within a block.

The picture elements of the known hybrid coder which are to be coded or decoded in progressively scanned form are arranged in accordance with Fig. 1a. This likewise applies for picture elements having static picture content for interlace scanned picture elements. Before the coding in the case of dynamic picture content, the lines of two blocks one above the other are inter-changed in accordance with Fig. 1b and after the decoding, they are re-arranged in accordance with Fig. 1a.

Fig. 2 shows a hybrid coder 25 corresponding to the aforesaid Standard Proposal. Interlace scanned picture signals from picture n are supplied to the input 21 and thence arrive in a picture store 22 and a movement detector 24. The items of data (two blocks one above the other) of picture n-1 needed by the movement detector 24 and the line sections of the respective two blocks involved are read out from the picture store 22 into a block store 23, from which the hybrid coder is able to select 8*8 blocks on each occasion. The picture elements for static picture content corresponding to Fig. 1a and those for dynamic picture content corresponding to Fig. 1b are buffer stored in the block store 23.

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The movement detector can be realised in accordance with various known methods. For example, the absolute value differences of picture elements from blocks having the same spatial position of picture n and picture n-1 may be formed for each block or double block that has to be coded. Alternatively, movement vectors (e.g. for two blocks one above the other on each occasion) formed by the hybrid coder 25 can be used instead of the movement detector. If the instantaneous sum of these absolute value differences and/or the amount of the corresponding movement vectors for this block or these blocks exceeds a predetermined threshold (i.e. dynamic picture content is involved), the picture elements corresponding to Fig. 1b, otherwise those corresponding to Fig. 1a, are buffer stored in the block store 23.

The re-sorting may be undertaken in accordance with the following listing:

```
DO y = 1,N/2
DO x = 1,N
      B_out1(x,y) = B_in1(x,2*y-1)
      B_out1(x,y) = B_in1(x,2*y)
  ENDDO
ENDDO
DO y = 1,N/2
DO x = 1,N
      B_out1(x,y+N/2) = B_in2(x,2*y-1)
      B_out1(x,y+N/2) = B_in2(x,2*y)
  ENDDO
ENDDO,
```

wherein, B_{in1} is the block located in the higher position and N is an even number.

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Claims

1. Method for the picture signal coding or decoding of picture element blocks of a predetermined size with the help of a transformation or inverse transformation using a hybrid coder (25) which codes blocks of picture elements, whereby a modified processing takes place in the event of dynamic picture content, characterised by the following method steps:
- only quadratic blocks of the predetermined size are transformed or inverse transformed independently of movement in the picture content;
- in the case of dynamic picture content (24), before the coding, line sections of blocks of interlace scanned picture elements (11-14, 21-24) within two blocks of the predetermined quadratic size arranged vertically one above the other are resorted or readdressed (figure 1b) so that within each of these blocks only line sections from one field of the picture signals are contained and after decoding the line sections are again arranged or addressed in the original sequence (figure 1a);
- in the case of static picture content, no such resorting or readdressing of the line sections takes place;
- an item of information which indicates whether a resorting or readdressing of the line section has taken place and which is correspondingly evaluated during the decoding, is added to the coded picture signals;
- in each case, four luminance picture element blocks of the predetermined quadratic size are combined in a square shape and the blocks are arranged vertically one above the other within these four combined blocks, the additional information added to the coded picture signals in each case being valid in common for the four combined blocks.

2. Method according to claim 1, in which the blocks have a predetermined size of 8 x 8 picture elements.

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3. Method according to claim 1 or 2, wherein the resorting or readdressing of the line sections is controlled by the output signal of a movement detector (24) and/or by movement vectors generated in the hybrid coder (25).

4. Method according to any of claims 1 to 3, wherein for movement detection for each of the blocks or double blocks to be coded the differences in the absolute value of picture elements from blocks of the same spatial position of two successive pictures are formed, such that, if the instantaneous sum of these differences in the absolute value for this block or this double block exceeds a predetermined threshold, the resorting or readdressing of the line sections takes place.

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11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14

11	11	11	11
13	13	13	13
21	21	21	21
23	23	23	23

21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24

a

12	12	12	12
14	14	14	14
22	22	22	22
24	24	24	24

b

FIG.1

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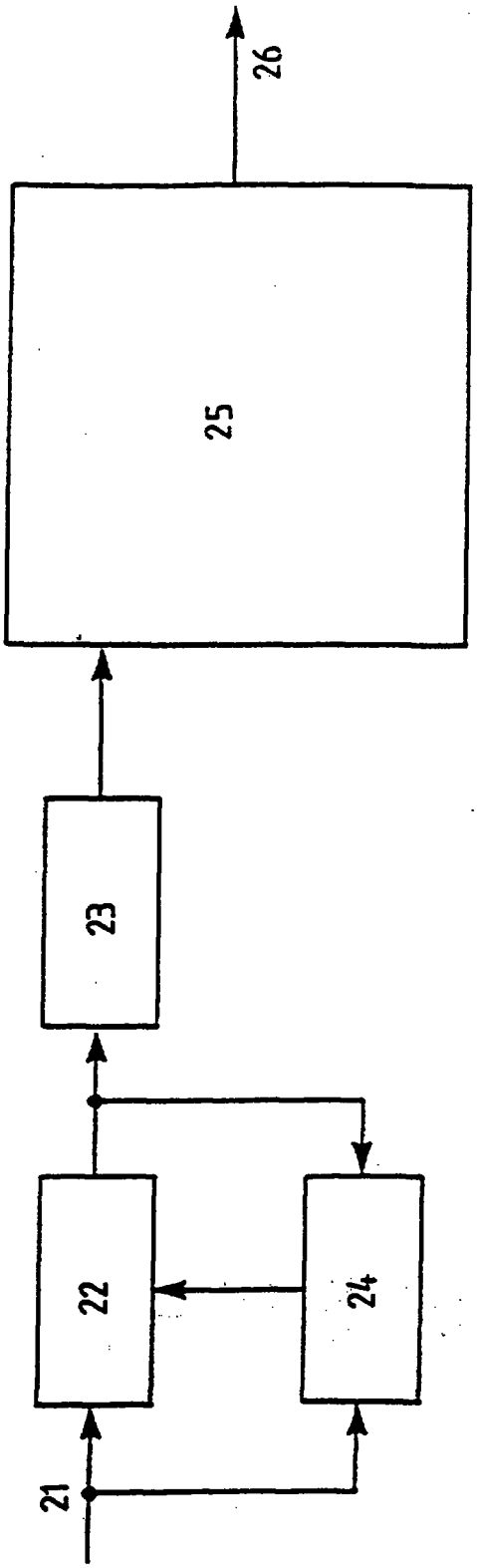


FIG. 2

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METHOD FOR VIDEO SIGNAL ENCODING

ABSTRACT

Transformation circuits for carrying out an 8*8 or 2*(4*8) DCT transformation exist. Switching between a 8*8 or 2*(4*8) DCT can be carried out by suitable choice of the logical level of a connecting line. Hybrid coders for picture signals are known which process blocks of progressively scanned input signals using DCT, blocks of 8*8 pixels being coded or decoded in each case. In the case of dynamic picture contents, the lines belonging to a field are combined to form a first 8*8 block, and the lines belonging to the corresponding second field are combined to form a second 8*8 block from these two superposed 8*8 pixel blocks and fed in this form to the hybrid coder. As a result of the reorganization of the input signals, switching between an 8*8 and a 2*(4*8) DCT transformation in the hybrid coder is unnecessary for interlace input signals, but an 8*8 DCT can be advantageously carried out also for a dynamic picture content.

FIGURE 1.

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