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(54) **MOTION ESTIMATION AND/OR COMPENSATION**

BEWEGUNGSSCHÄTZUNG UND/ODER KOMPENSATION

ESTIMATION ET/OU COMPENSATION DU MOUVEMENT

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EP 1 430 724 B1

Description

FIELD OF INVENTION

[0001] The present invention relates to a method for compensation of motion in video images as set forth in the preamble of claim 1. The method also relates to the device for compensation of motion in video images as set forth in the preamble of claim 11.

BACKGROUND OF INVENTION

[0002] Hervé Benoit: "Digital Television, MPEG-1, MPEG-2 and principles of the DVB system", London, 1997, pages 40-42 discloses that P and B pictures are predicted from preceding and/or subsequent pictures by using motion estimation. Motion estimation consists of defining a motion vector which ensures the correlation between an 'arrival' zone on a second picture and a 'departure' zone on a first picture, using a technique known as block matching. This is done at macroblock level (16 x 16 pixels) by moving a macroblock of the current picture within a small search window from the previous picture, and comparing it to all possible macroblocks of the window in order to find the one that is most similar. The difference (or prediction error) between the actual block to be encoded and the matching block is calculated, and encoded in a similar way to the blocks of the I pictures. This process is called motion compensation.

[0003] Another application of motion estimation and/or compensation is video scan rate conversion, where the output image rate of a video signal processing system differs from the input image rate. Also this type of application benefits from the use of motion vectors, as described by Gerard de Haan et al in "True-motion Estimation with 3-D Recursive Search block Matching, IEEE Transactions on Circuits and Systems for Video Technology, Vol. 3, No. 5, October 1993, and by Gerard de Haan in "IC for Motion-compensated De-interlacing Noise Reduction and Picture-rate conversion", IEEE Transactions on Consumer Electronics, Vol. 45, No. 3, August 1999.

[0004] For such encoding or scan rate conversion methods as well as other practical applications of motion estimation and/or motion compensation the determination of motion vectors is usually based on block matching, by which for a selected generally square block of pixels, typically containing 16 x 16 or 8 x 8 pixels, of an encoded image a surrounding sub-area is defined with the pixel block positioned in its centre and typically containing e.g. 88 x 40 pixels. This sub-area is applied as a search area or window around the pixel block at the same spatial position of a preceding image for searching a pixel block located within the search area or window having a video signal information matching that of the selected pixel block. See also Hentschel, 'Video-Signalverarbeitung', B.G. Teubner Stuttgart 1998, pages 214-217.

[0005] In present systems, image data of this search area or window is usually stored in a local buffer or on-chip memory to which rather extreme bandwidth requirements are made.

[0006] The search area relates to the area that includes all possible locations of the image segment (e.g. a macroblock) moved over the motion vector ranges possible for that image segment. Therefore, there is a direct relationship between the size of the search area and the motion vector ranges. A larger search area usually improves the motion estimation and/or compensation. However, a larger search area requires more resources especially in amount of buffer memory, which relates to silicon area. This results in a tradeoff between the quality and the implementation costs.

[0007] The document CHOON-HOON LEE ET AL: " A new block-matching algorithm based on an adaptive search area adjustment using spatio-temporal correlation" CONSUMER ELECTRONICS, 1999. ICCE. INTERNATIONAL CONFERENCE ON LOS ANGELES, CA, USA 22-24 JUNE 1999, PISCATAWAY, NJ, USA, IEEE, US, 22 June 1999 (1999-06-22), pages 362-363, XP 010346596 ISBN: 0-7803-5123-1 relates to a block-matching algorithm based on an adaptive adjustment of the search area using spatio-temporal correlation to reduce the computational complexity of the full-search algorithm without significant degradation of video quality. Each block is classified into one of four types, background block, active moving block, and changing block from background to active region or vice versa. For each block type, the size of a search area is set as w for active block and changing block from background to active region, w/4 for background block, and w/2 for changing block from active region to background, respectively, where w is an initial maximum displacement of motion vectors.

[0008] The document ISMAEIL I ET AL: "Efficient motion estimation using spatial and tempral motion vector prediction" IMAGE PROCESSING, 1999, ICIP 99. PROCEEDINGS. 199 INTERNATIONAL CONFERENCE ON KOBE, JAPAN 24-28 OCT. 1999, PISCATAWAY, NJ, USA, IEEE, US, 24 October 1999 (1999-10-24), pages 70-74, XP010369195 ISBN: 0-7803-5467-2 relates to a motion estimation technique for the coding of moving video sequences that is based on spatial and temporal predictions. The motion vector of a moving object is tracked using spatial and temporal prediction and used as a starting point for the motion estimation search algorithm. The predicted motion vector is selected from several candidate motion vectors according to the block matching criterion. Experimental results show that spatio-temporal prediction reduces the number of computations performed by the motion search algorithm, by 30% for MPEG-2 encoding and by 40% for H.263 coding.

SUMMARY OF INVENTION

[0009] It is an object of the present invention to provide an improved motion estimation and/or compensation.

[0010] To this end, the invention provides a method and device as set forth in the characterizing part of the independent claims. Advantageous embodiments are defined in the dependent claims.

[0011] According to a first aspect of the invention, the search area is defined to have its center offset from a center of the image segment. By introducing an offset, the search area can be defined in a favorable position. For example, if motion is expected in a given direction, the search window may be defined having an offset in the same direction resulting in larger motion vector ranges being possible in the direction of the expected motion. In fact, the search window is enlarged in a favorable direction at the cost of a reduction of the search area in the opposite direction. By offsetting the center of the search area or window from the center of the image segment actually being processed (the selected image segment) such as an 8 x 8 pixel block, the location of the local search area or window will become asymmetric relative to the image segment. Instead of (global) motion, other image characteristics may also be used to define an offset for the search area. This aspect of the invention is especially advantageous in applications wherein image data related to the search area is retrieved from an image memory, which image data is temporarily stored in a buffer memory.

[0012] In a practical embodiment, the offset is in a horizontal direction of the video image only. This is advantageous because in video, motion in horizontal direction is most common.

[0013] In a practical embodiment, the offset is determined by a global motion parameter. This parameter may be extracted from global motion within a sequence of images or may be locally adapted to motion properties in a part of the image. The maximum range of the motion vectors in the direction of the global motion will increase and a compensation of the global motion will be provided.

[0014] Motion estimation and/or compensation according to embodiments of the invention may be applied to all digital video signal processing functions involving the use of motion estimation and/or motion compensation such as motion compensated prediction in encoding/compressing of digital video signals, motion compensated filtering in noise reduction, motion compensated interpolation in video format conversion, motion compensated de-interlacing of interlaced video signals etc.

[0015] In the following the invention will be explained in further detail with reference to the accompanying drawings, wherein

BRIEF DESCRIPTION OF DRAWINGS

[0016]

Fig. 1 illustrates a search area with vector limitations as known in the prior art,

Fig. 2 illustrates a search area with compensation for global motion in accordance with an embodiment of the present invention,

Fig. 3 is a simplified block diagram of a possible motion estimator architecture according to an embodiment of the invention for use, e.g. in video scan rate conversion,

Fig. 4 shows a distribution system according to an embodiment of the invention, and

Fig. 5 shows a reproduction apparatus according to an embodiment of the invention.

DETAILED DESCRIPTION OF EMBODIMENTS

[0017] In Fig. 1 an example is given of the application of a motion vector V to interpolation of an image in a sequence of consecutive video images on the basis of a preceding image of the sequence. Such interpolation is typically used in video scan rate conversion, e.g. from 50 Hz in to 100 Hz image format.

[0018] Each motion vector V describes a difference in position between an image segment B1 in a first image P1 and a matching image segment B2 in a second image P2. In one-directional prediction the second image P2 is usually a previous image, although the second image P2 may also be a subsequent image. According to this description, a motion vector is defined in a two-dimensional plane and has an X component and an Y component.

[0019] In practical embodiments, the image segments B1 and B2 are blocks, e.g. of 8 x 8 pixels. The motion vector determination is based on a so-called block matching technique as known in the art. In the second image P2, a selected block B 12 is defined corresponding with the selected block B1 in the first image P1. A search area S is defined around the block B12 depending on the ranges of the motion vectors possible for B1/B12. Typically, the search area S may comprise a number of pixel blocks surrounding the pixel block B12 in the horizontal and vertical directions and for a block of 8 x 8 pixels the size of the search area S may be e.g. 88 x 40 pixels. The motion vector V to be assigned to the block B1/B12 is determined by searching the search area or window S for the block B2 best matching the pixel block B1.

[0020] By use of the block matching technique this searching process can be conducted with a varying level of complexity depending to some extent on the actual application of motion estimation, but involves typical selection of a best vector from a set of so-called candidate vectors stored in a prediction memory. Details of the searching process is not explained here, but a comprehensive analysis of various options is given in Gerard de Haan et al: "True-motion Estimation with 3-D Recursive Search Block Matching", IEEE transactions on Circuits and Systems for Video Technology, Vol.3, No. 5, October 1993 and Gerard de Haan: "IC for Motion-compensated De-interlacing, Noise Reduction and Picture-rate conversion", IEEE Transactions on Consumer Electronics, Vol. 45, No. 3, August 1999, as mentioned before.

[0021] In this way motion vectors may be determined for all blocks of the image P1. The motion vectors may be used to interpolate images to obtain in the desired video format conversion.

[0022] The maximum range of the motion vector V relates to the size of the search area or window S and with the actual pixel block centered in the search area or window the maximum range of horizontal and vertical components of the maximum motion vector V will, in the illustrated example be 40 and 16 pixels in horizontal and vertical direction, respectively, corresponding to 8 and 5 pixel blocks, respectively.

[0023] Fig. 2 illustrates motion estimation and/or motion compensation according to an embodiment of the present invention, wherein the search area or window S assigned to the pixel block B12 in the image P2 is defined to have its center offset from the position of the pixel block B12 by an offset CO. The offset is advantageously determined by a global motion parameter, which is extracted e.g. from global motion in the sequence of images including the image under processing as may be caused typically by camera movement in the form of panning or tilting. Thereby, the search area or window S will be asymmetrically positioned with respect to the block B12 and the maximum range for determination of the motion vector may be extended in one horizontal direction and/or one vertical direction. In the example illustrated in Fig. 2 the center offset CO for the search area or window S amounts to 10 pixels in the horizontal direction and 8 pixels in the vertical direction resulting in a maximum range of 50 pixels in the horizontal direction (to the right) and 24 pixels in the vertical direction (to the top).

[0024] In a simple implementation of the asymmetric displacement of the search area or window S with respect to the block B 12 the global motion parameter determining the center offset CO may be determined from the average vector of the motion vectors established for one or more previous images.

[0025] In more advanced systems statistics of previously calculated vector fields may be used for calculation of maximum vector values to determine the center offset CO.

[0026] In the simplified block diagram in Fig. 3 of a possible motion estimator architecture for use e.g. in video scan rate conversion, incoming images are supplied to an image memory 1, from which the actual image pair P1 and P2 comprising groups of image segments for which motion vectors are to be determined, is transferred to a block matcher 2. In the block matcher 2 a search for image segment groups or blocks in the image P2 matching selected image blocks in the image P1 is conducted by application of a search area S transferred to the blockmatcher 2 from a local buffer or search area memory 3 and by use of a set of candidate motion vectors CV transferred to the block matcher 2 from a vector memory 4.

[0027] The search area S temporarily stored in the buffer memory 3 is obtained from the image P2, which has been stored in image memory 1'. The image memories 1 and 1' may be implemented in one image memory.

[0028] The vector memory 4 stores all motion vectors determined for segment groups or blocks of the second image P2 and an image block to be searched in the image P1 the set of candidate vectors may typically comprise motion vectors determined for an image block with same location in the preceding image or an adjacent image block in the actual image.

[0029] According to the invention an enlargement of the range of motion vectors possible for a given size of the search area S is made possible by modification of the definition of the search area to have its center offset from the position in the image of the segment group or block under investigation.

[0030] In a simple implementation this modification may be conducted as illustrated by determination of a motion compensation parameter CP by analysis of previously found vectors from the vector memory 4 in a vector analyzer 5.

[0031] The block matching process conducted in block matcher 2 is known in the art and involves comparison or matching of blocks localized by application of the candidate vectors.

[0032] Through this process each match error M is passed to a vector selector 6 which selects the best match and stores the corresponding candidate vector in the vector memory 4 for use in the determination of future motion vectors.

[0033] The simple motion estimator architecture illustrated in Fig. 3 is only one example of implementation of the invention. As an alternative possibility motion compensation parameters from previously processed image blocks or preceding images could be stored in a global motion estimation memory, from which a motion compensation parameter for actual use could be retracted by appropriate selection means.

[0034] Fig. 4 shows a distribution system 10 according to an embodiment of the invention. The distribution system 10 comprises means 100 for obtaining a sequence of video images. The means 100 may be a camera, but also an input unit such as an antenna for receiving a signal carrying the sequence of video images. The means 100 may further be a reading unit for a record carrier. The distribution system further comprises an encoder 101 for encoding the sequence of video images to obtain an encoded digital video signal. The encoder 101 comprises a motion estimation and/ or compensation device which uses an asymmetric search area, e.g. the device of Fig. 3. The distribution system 10 further comprises an output unit 102 for outputting the encoded video signal, e.g. by storing the signal on a storage product 20. Preferably, the output unit 102 incorporates a representation of the offset of the asymmetric search area as prediction information in the encoded video signal. The offset may be explicitly included in the signal, but may also be implicitly included in the motion vector ranges.

[0035] Fig. 5 shows a reproduction apparatus 30 such as a television or digital receiver according to an embodiment of the invention. The reproduction apparatus 30 comprises an input unit 300 to obtain an encoded digital video signal comprising a sequence of encoded video images and a decoder unit 301, which may be complementary to the encoder unit 101 of the distribution system suitably arranged to receive encoded video images. The sequence of encoded video images may be obtained from a storage product 20'. The reproduction apparatus 30 further comprises a processor 302 performing inter alia motion compensating and/or estimating using an asymmetric search area. Thereto the processor 302 may comprise a device as given in Fig. 3. An output unit 303 (e.g. a display) outputs the processed video images. The processing performed in the device 302 may be a scan rate conversion performing motion estimation and/ or motion compensation with an asymmetric search area. In the case the reproduction apparatus is processing the signal obtained from the distribution system 10 of Fig. 4, the search area may be determined by the motion vector information included in the signal.

[0036] It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be able to design many alternative embodiments without departing from the scope of the appended claims. In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim. The word 'comprising' does not exclude the presence of other elements or steps than those listed in a claim. The invention can be implemented by means of hardware comprising several distinct elements, and by means of a suitably programmed computer. In a device claim enumerating several means, several of these means can be embodied by one and the same item of hardware. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage.

Claims

1. A method of estimating motion from a first video image (P1) to a second video image (P2), the method comprising:

selecting a first image segment (B1) of the first video image (P1);
searching image data from the second video image (P2) for a second image segment (B2) wherein the image data best matches image data of the first image segment (B1);
defining a further image segment (B12) in the second image (P2) having the same spatial position as the first image segment (B1), the further image segment (B12) having an image segment centre;
defining a search area (S) around the further image segment (B12), the defining being based on ranges of possible motion vectors (V) for the image segment, said search area (S) having a search area centre; and
retrieving image data related to said search area;

the method being **characterized in that**
the search area (S) is defined to have its center offset (CO) from a center of the image segment (B12) wherein the offset is determined by a global motion parameter; and
the image data of the defined search area is retrieved from an image memory in said step of retrieving and transferred to a block matcher to perform said searching using the transferred search area.

2. A method as claimed in claim 1, wherein said offset is in a horizontal direction of the video image only.

3. A method as claimed in claim 1, wherein said offset is in a vertical direction of the image only.

4. A method as claimed in claim 1, wherein said offset depends on a location of said image segment in the video image.

5. A method as claimed in claim 1, wherein said offset has a value, which is the same for all locations of the first image segment within the video image.

6. A method as claimed in any one of the previous claims, wherein said global motion parameter depends on properties of a motion vector field of at least one preceding video image.

7. A method as claimed in claim 6, wherein said global parameter depends on minimum and maximum values of motion vectors in said motion vector field.

8. A method as claimed in claim 6, wherein said global motion parameter depends on an average value of motion vectors in said motion vector field.

9. A method as claimed in any one of the previous claims, wherein said global motion parameter is determined by a separate motion estimator.

10. A method as claimed in any one of the previous claims, wherein a sequence of video images are encoded into an encoded video signal, **characterized by** encoding a representation of said offset as prediction information in said encoded video signal.

11. A device (101, 301) for estimating motion from a first video image (P1) to a second video image (P2), the device comprising:

means (2,4) for selecting a first image segment (B1) of the first video image (P1) and a further image segment (B12) in the second image (P2) having the same spatial position as the first im-

age segment (B1), the further image segment (B12) having an image segment centre;
means for searching image data from the second video image (P2) for a second image segment (B2) wherein the image data best matches image data of the first image segment (B1);
means (2,3) for defining a search area (S) around the further image segment, the defining being based on ranges of possible motion vectors (V) for the image segment said search area (S) having a search area centre; and
means (2,3) for retrieving image data related to said search area; the device being **characterized in that**

- the means for defining comprise means for defining the search area to have its center offset from a center of the image segment wherein the offset is determined by a global motion parameter; and

the means for retrieving are configured to retrieve the image data of the defined search area is retrieved from an image memory in said step of retrieving and transferred the search area to a block matcher to perform said searching using the transferred search area.

12. A device as claimed in claim 11, further comprising an encoder for encoding a sequence of video images into a video signal, **characterized by** means for incorporating a representation of said offset as prediction information in said encoded video signal.

Patentansprüche

1. Verfahren zum Schätzen von Bewegung von einem ersten Videobild (P1) zu einem zweiten Videobild (P2), umfassend:

Auswählen eines ersten Bildsegments (B1) des ersten Videobildes (P1);
Durchsuchen von Bilddaten aus dem zweiten Videobild (P2) nach einem zweiten Bildsegment (B2), in welchem die Bilddaten am besten mit den Bilddaten des ersten Bildsegments (B1) übereinstimmen;
Definieren eines weiteren Bildsegments (B12) im zweiten Bild (P2) mit derselben räumlichen Position wie das erste Bildsegment (B1), wobei das weitere Bildsegment (B12) ein Bildsegmentzentrum aufweist;
Definieren eines Suchbereiches (S) um das weitere Bildsegment (B12), wobei das Definieren auf Bereichen möglicher Bewegungsvektoren (V) für das Bildsegment beruht, und wobei der Suchbereich (S) ein Suchbereichszentrum aufweist; und
Wiedergewinnen von Bilddaten in Bezug auf den Suchbereich;

wobei das Verfahren **dadurch gekennzeichnet ist, dass**
der Suchbereich (S) so definiert ist, dass er einen Zentrumsversatz (CO) von einem Zentrum des Bildsegments (B12) aufweist, wobei der Versatz durch einen globalen Bewegungsparameter bestimmt ist; und
die Bilddaten des definierten Suchbereiches aus einem Bildspeicher im Schritt der Wiedergewinnung wiedergewonnen werden und zu einem Blockabgleicher übermittelt werden, um die Suche unter Verwendung des übermittelten Suchbereiches durchzuführen.

2. Verfahren nach Anspruch 1, wobei der Versatz nur in einer horizontalen Richtung des Videobildes auftritt.

3. Verfahren nach Anspruch 1, wobei der Versatz nur in einer vertikalen Richtung des Bildes auftritt.

4. Verfahren nach Anspruch 1, wobei der Versatz von einem Ort des Bildsegments im Videobild abhängt.

5. Verfahren nach Anspruch 1, wobei der Versatz einen Wert aufweist, der für alle Orte des ersten Bildsegments innerhalb des Videobildes gleich ist.

6. Verfahren nach irgendeinem der vorangehenden Ansprüche, wobei der globale Bewegungsparameter von Eigenschaften eines Bewegungsvektorfeldes wenigstens eines vorangehenden Videobildes abhängt.

7. Verfahren nach Anspruch 6, wobei der globale Parameter von minimalen und maximalen Werten der Bewegungsvektoren im Bewegungsvektorfeld abhängt.

8. Verfahren nach Anspruch 6, wobei der globale Bewegungsparameter von einem Mittelwert der Bewegungsvektoren im Bewegungsvektorfeld abhängt.

9. Verfahren nach irgendeinem der vorangehenden Ansprüche, wobei der globale Bewegungsparameter durch eine separate Bewegungsschätzvorrichtung bestimmt wird.

10. Verfahren nach irgendeinem der vorangehenden Ansprüche, wobei eine Sequenz von Videobildern zu einem codierten Videosignal codiert wird, **gekennzeichnet durch** das Codieren einer Darstellung des Versatzes als Vorhersageinformation im codierten Videosignal.

11. Vorrichtung (101, 301) zum Schätzen von Bewegung von einem ersten Videobild (P1) zu einem zweiten Videobild (P2), umfassend:

Mittel (2,4) zum Auswählen eines ersten Bildsegments (B1) des ersten Videobildes (P1) und eines weiteren Bildsegments (B12) im zweiten Bild (P2), das dieselbe räumliche Position wie das erste Bildsegment (B1) aufweist, wobei das weitere Bildsegment (B2) ein Bildsegmentzentrum aufweist;
Mittel zum Durchsuchen der Bilddaten aus dem zweiten Videobild (P2) nach einem zweiten Bildsegment (B2), in welchem die Bilddaten am besten mit den Bilddaten des ersten Bildsegments (B1) übereinstimmen;
Mittel (2, 3) zum Definieren eines Suchbereiches (S) um das weitere Bildsegment, wobei das Definieren auf Bereichen möglicher Bewegungsvektoren (V) für das Bildsegment beruht und der Suchbereich (S) ein Suchbereichszentrum aufweist; und
Mittel (2, 3) zum Wiedergewinnen von Bilddaten in Bezug auf dem Suchbereich;

wobei die Vorrichtung **dadurch gekennzeichnet ist, dass**
die Mittel zum Definieren Mittel umfassen zum Definieren des Suchbereiches, dessen Zentrum gegenüber einem Zentrum des Bildsegments versetzt ist, wobei der Versatz durch einen globalen Bewegungsparameter bestimmt ist; und
die Mittel zum Wiedergewinnen dafür ausgelegt sind, die Bilddaten des definierten Suchbereiches aus einem Bildspeicher im Schritt der Wiedergewinnung wieder zu gewinnen und den Suchbereich zu einem Blockabgleicher zu übermitteln, um die Suche unter Verwendung des übermittelten Suchbereiches durchzuführen.

12. Vorrichtung nach Anspruch 11, die ferner einen Codierer umfasst zum Codieren einer Sequenz von Videobildern zu einem Videosignal, **gekennzeichnet durch** Mittel zum Eingliedern einer Darstellung des Versatzes als Vorhersageinformation in das codierte Videosignal.

Revendications

1. Procédé d'évaluation du mouvement à partir d'une première image vidéo (P1) vers une seconde image vidéo (P2), le procédé comprenant les étapes consistant à :

sélectionner un premier segment d'image (B1) de la première image vidéo (P1) ;
rechercher des données d'image provenant de la seconde image vidéo (P2) correspondant à un second segment d'image (B2) dans lequel les données d'image coïncident au mieux avec les données d'image du premier segment d'image (B1) ;
définir un segment d'image supplémentaire (B12) dans la seconde image (P2) présentant la même position spatiale que le premier segment d'image (B1) le segment d'image supplémentaire (B12) ayant un centre de segment d'image ;
définir une zone de recherche (S) autour du segment d'image supplémentaire (B12), la définition étant fondée sur la base des domaines de vecteurs de mouvement possibles (V) pour le segment d'image, ladite zone de recherche (S) ayant un centre de zone de recherche ; et
extraire des données d'image se rapportant à ladite zone de recherche ;

le procédé étant **caractérisé en ce que**
la zone de recherche (S) est définie pour avoir son centre décalé (CO) d'un centre du segment d'image (B12) dans lequel le décalage est déterminé par un paramètre de mouvement global ; et
les données d'image de la zone de recherche définie sont extraites à partir d'une mémoire d'images dans ladite étape d'extraction et sont transférées vers un adaptateur de bloc en vue d'exécuter ladite recherche en utilisant la zone de recherche transférée.

2. Procédé selon la revendication 1, dans lequel ledit décalage est effectué dans une direction horizontale de l'image vidéo seulement.

3. Procédé selon la revendication 1, dans lequel ledit décalage est effectué dans une direction verticale de l'image seulement.

4. Procédé selon la revendication 1, dans lequel ledit décalage dépend de la position dudit segment d'image dans l'image vidéo.

5. Procédé selon la revendication 1, dans lequel ledit décalage a une valeur, laquelle est la même pour toutes les positions du premier segment d'image à l'intérieur de l'image vidéo.

6. Procédé selon l'une quelconque des revendications précédentes, dans lequel ledit paramètre de mouvement global dépend des propriétés d'un champ de vecteurs de mouvement d'au moins une image vidéo précédente.

7. Procédé selon la revendication 6, dans lequel ledit paramètre global dépend des valeurs minimale et maximale des vecteurs de mouvement dans ledit champ de vecteurs de mouvement.

8. Procédé selon la revendication 6, dans lequel ledit paramètre de mouvement global dépend d'une valeur moyenne des vecteurs de mouvement dans ledit champ de vecteurs de mouvement.

9. Procédé selon l'une quelconque des revendications précédentes, dans lequel ledit paramètre de mouvement global est déterminé par un dispositif d'évaluation de mouvement séparé.

10. Procédé selon l'une quelconque des revendications précédentes, dans lequel une séquence des images vidéo est codée en un signal vidéo codé, **caractérisé par** un codage d'une représentation dudit décalage sous la forme d'une information de prédiction dans ledit signal vidéo codé.

11. Dispositif (101, 301) destiné à évaluer un mouvement à partir d'une première image vidéo (P1) vers une seconde image vidéo (P2), le dispositif comportant :

des moyens (2, 4) pour sélectionner un premier segment d'image (B1) de la première image vidéo (P1) et un segment d'image supplémentaire (B12) dans la seconde image (P2) présentant la même position spatiale que le premier segment d'image (B1), le segment d'image supplémentaire (B12) ayant un centre de segment d'image ;
des moyens pour rechercher des données d'image à partir de la seconde image vidéo (P2) correspondant à un second segment d'image (B2) dans lequel les données d'image coïncident au mieux avec des données d'image du premier segment d'image (B1) ;
des moyens (2, 3) pour définir une zone de recherche (S) autour du segment d'image supplémentaire, la définition s'effectuant sur la base de domaines de vecteurs de mouvement possibles (V) pour le segment d'image , ladite zone de recherche (S) ayant un centre de zone de recherche ; et
des moyens (2, 3) pour extraire des données d'image se rapportant à ladite zone de recherche ;

le dispositif étant **caractérisé en ce que**
les moyens de définition comportent des moyens pour définir la zone de recherche afin d'avoir son centre décalé d'un centre du segment d'image dans lequel le décalage est déterminé par un paramètre de mouvement global ; et
les moyens d'extraction sont configurés pour extraire les données d'image de la zone de recherche définie qui sont extraites à partir d'une mémoire d'images dans ladite étape d'extraction et la zone de recherche est transférée vers un adaptateur de bloc en vue d'exécuter ladite recherche en utilisant la zone de recherche transférée.

12. Dispositif selon la revendication 11, comprenant, de plus, un codeur pour coder une séquence d'images vidéo en un signal vidéo, **caractérisé par** des moyens servant à incorporer une représentation dudit décalage sous la forme d'une information de prédiction dans ledit signal vidéo codé.

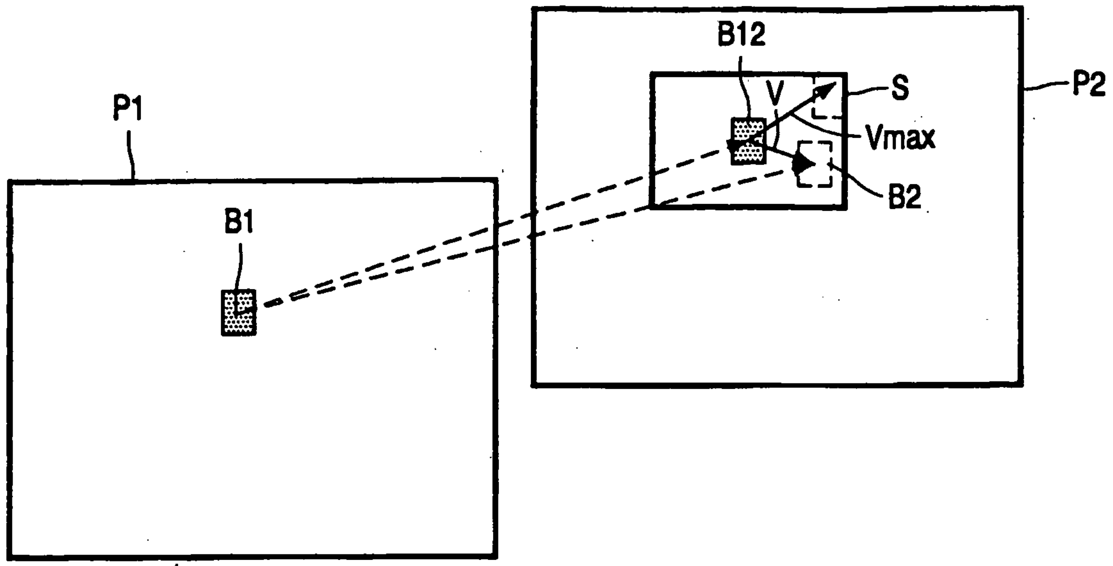

FIG. 1

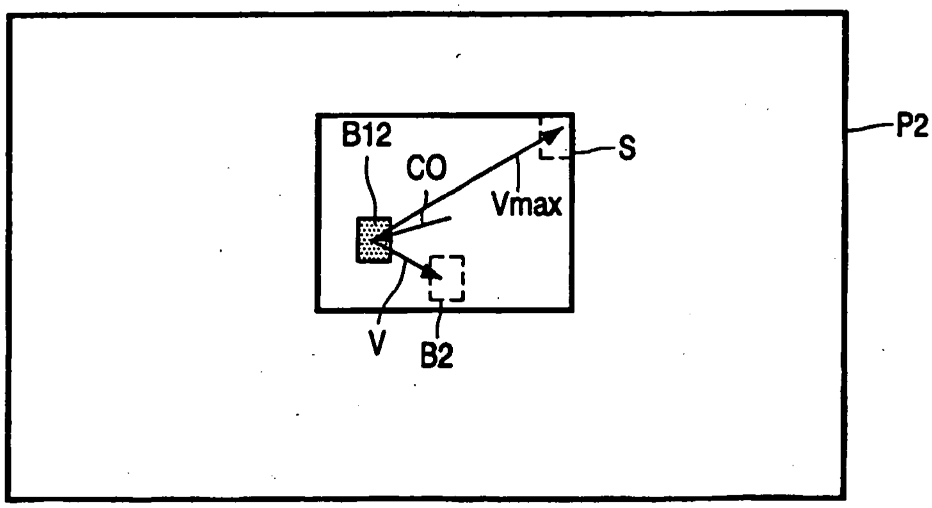

FIG. 2

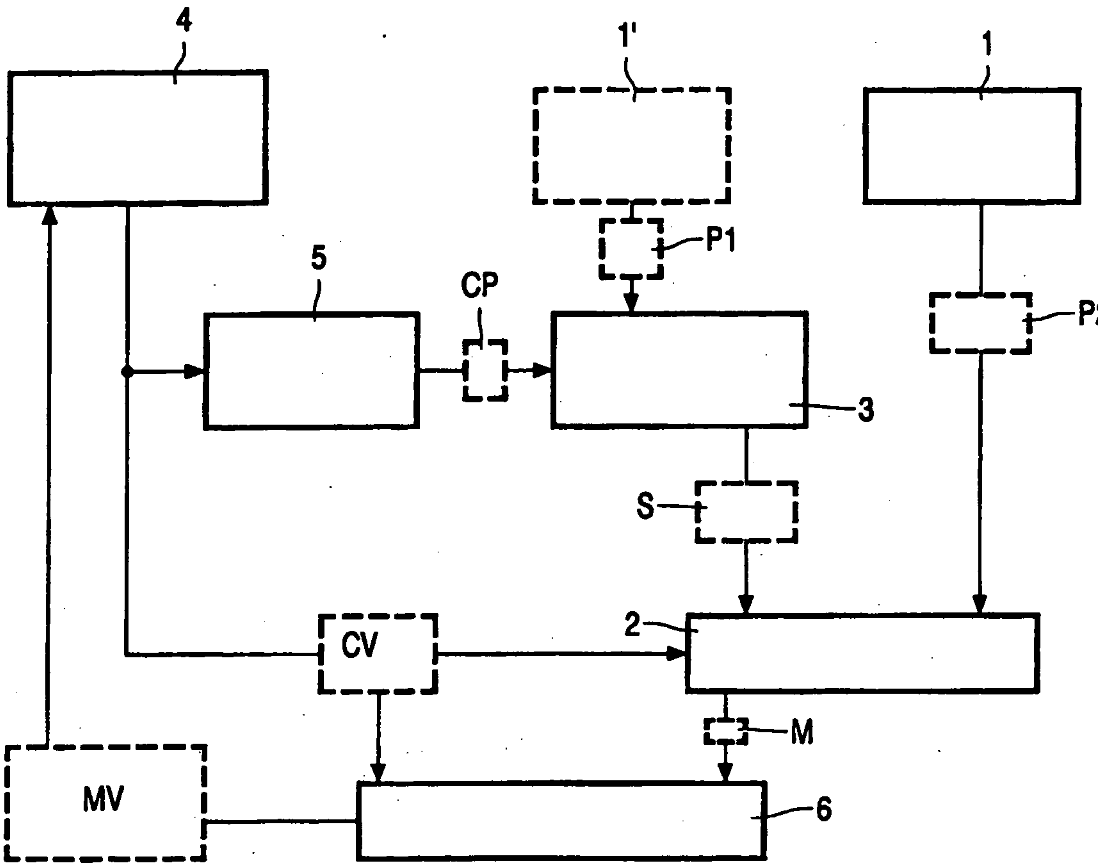

FIG. 3

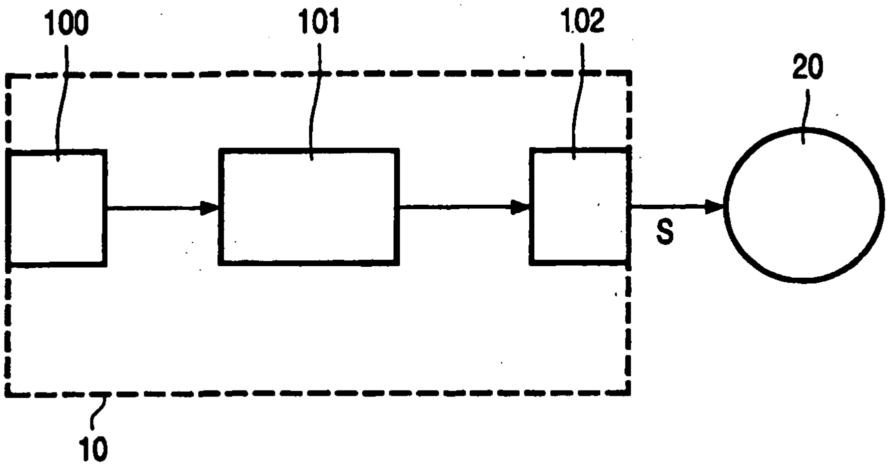

FIG. 4

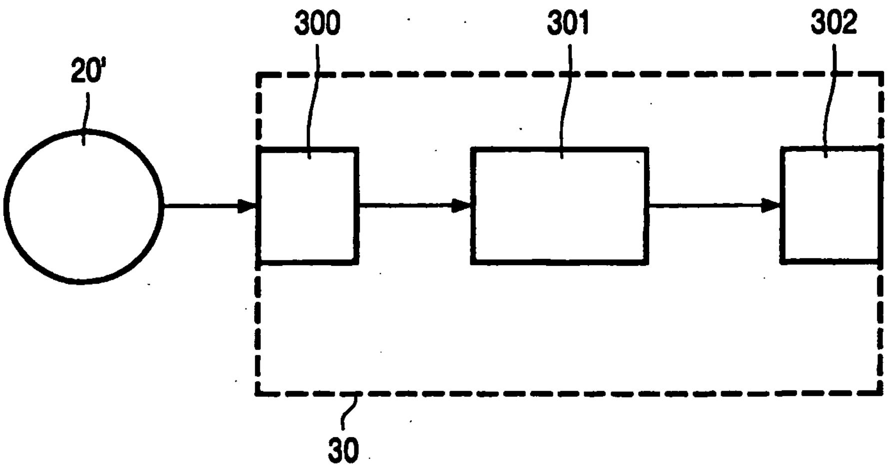

FIG. 5

REFERENCES CITED IN THE DESCRIPTION

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