Decision on Opposition

Opposition No. 2021-700438

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The case of opposition against the invention "Video decoding Device, Video encoding Device, and Bit Stream Transmission Method" in Japanese Patent No. 6783355 has resulted in the following decision.

Conclusion

The patent according to claims of Japanese Patent No. 6783355 shall be maintained.

Reason

I. History of Procedures

The application for a patent for Claims 1 to 3 of Japanese Patent No. 6783355 (hereinafter referred to as "the Patent") is filed as Japanese Patent Application No.2019-122135 on June 28, 2019, which is a divisional application of Japanese Patent Application No.2017-164566 filed on August 29, 2017, which is a divisional application of Japanese Patent Application No.2016-021985, filed on February 8, 2016, which is a divisional application of Japanese Patent Application No. 2013-551919 with the international filing date of January 31, 2012 (acceptance of Priority Claim Foreign Agency based on Paris Treaty: January 31, 2011, Korean Intellectual Property Office; March 3, 2011, Korean Intellectual Property Office; May 27, 2011, Korean Intellectual Property Office; July 1, 2011, Korean Intellectual Property Office; January 31, 2012, Korean Intellectual Property Office) The establishment of the patent right was registered on October 23, 2020 (the patent gazette thereof was issued on November 11, 2020), and an opposition to the granted patent regarding Claims 1 to 3 was filed by the opponent, Unified Patents LLC, on May 10, 2021.

II. The Inventions

The inventions according to Claims 1 to 3 of the Patent (hereinafter referred to as "the Inventions 1 to 3" and the like) are specified by the following matters recited in Claims 1 to 3 of scope of claims of the Patent. (Signs A1 to F1, A2 to F2, and A3 to F3 are attached by the panel. Hereinafter, they are referred to as components A1 to F3 and the like.)

(The Invention 1)

[Claim 1]

F1 An video decoding device, comprising:

A1 a reference picture buffer that stores a reference picture; and

B1 a motion compensation unit that generates a predicted block using the reference picture and a motion vector of the reference picture, wherein

C1 the motion vector of the reference picture is clipped in a predetermined range,

D1 the clipped motion vector is used as a predicted motion vector to generate the predicted block,

E1 the motion vector of the reference picture is

E1-3 a motion vector of a block in the reference picture selected from

E1-1 a block that exists at the same position as a current block, and

E1-2 a block that exists at a position that spatially corresponds to the current block.

(The Invention 2)

[Claim 2]

F2 An video encoding device, comprising:

A2 a reference picture buffer that stores a reference picture;

B2-1 a motion compensation unit that generates a predicted block using the reference picture and a motion vector of the reference picture;

B2-2 a subtractor that subtracts the predicted block from a current block to generate a residual block; and

B2-3 an entropy encoding unit that generates a bit stream by encoding a quantized conversion coefficient of the residual block, wherein

C2 the motion vector of the reference picture is clipped in a predetermined range,

D2 the clipped motion vector is used as a predicted motion vector to generate the predicted block,

E2 the motion vector of the reference picture is

E2-3 a motion vector of a block in the reference picture selected from

E2-1 a block that exists at the same position as a current block, and

E2-2 a block that exists at a position that spatially corresponds to the current block.

(The Invention 3)

[Claim 3]

F3 A bit stream transmission method executable by an video encoding device, comprising:

A3 a step of storing a reference picture;

B3-1 a step of generating a predicted block using the reference picture and a motion vector of the reference picture; and

B3-2 a step of transmitting a bit stream encoded based on the predicted block to an video decoding device, wherein

C3 the motion vector of the reference picture is clipped in a predetermined range,

D3 the clipped motion vector is used as a predicted motion vector to generate the predicted block,

E3 the motion vector of the reference picture is

E3-3 a motion vector of a block in the reference picture selected from

E3-1 a block that exists at the same position as a current block, and

E3-2 a block that exists at a position that spatially corresponds to the current block.

III. Reasons for Revocation in Written Opposition

An outline of the reasons for revocation stated in the patent opposition is as follows.

1. Reasons for Revocation

(1) Reason 1 for Revocation

The Inventions 1 to 3 are identical with the inventions described in Evidence A No. 1, and should not be granted a patent under the provisions of the Patent Act Article 29(1)(iii), and therefore, the Patents 1 to 3 fall under the Patent Act Article 113(2) and should be revoked.

(2) Reason 2 for Revocation

Even if there is a difference between the Inventions 1 to 3 and the inventions described in Evidence A No. 1, the Inventions 1 to 3 could have been easily made by a person skilled in the art before the filling of the application based on the inventions described in Evidence A No. 1 or based on the inventions described in Evidence A No. 1 and inventions described in well-known techniques. Since the Inventions 1 to 3 should not be granted a patent under the provisions of the Patent Act Article 29(2), the Patents 1 to 3 fall under the Patent Act Article 113(2) and should be revoked.

2. Means of Evidence

(1) Evidence A No. 1: International Publication No. WO98/59496

(2) Evidence A No. 2: Impress Standard Textbook Series Revised Third Edition H.264/AVC Textbook, 1st Edition, published January 1, 2009, Impress R&D Co., Ltd., p. 86-87, p. 128-131

(3) Evidence A No. 3: "MPEG-4 Encoding Efficiency" by JYOZAWA Hironao, Proceedings of Winter Convention, Image Media Division, Institute of Television Engineers, December 4, 1996, p. 39-44

(4) Evidence A No. 4: "HDTV High Compression Technology-Examination of Making MPEG-2 Bit Rate Lower" by OTSUKA Yoshimichi, NAITO Sei, INOMATA Hideki, Technical Research Report of the Institute of Image Information and Television Engineers, March 20, 2002, p.25-30

(5) Evidence A No. 5: JP 2009-533901A

(6) Evidence A No. 6: International Publication No. WO2008/136178

(page 114 in Written Opposition, "6 Means of Evidence")

IV. Judgment by the Body

In the body, the Invention 2 is judged first, and then the Inventions 1 and 3 are judged.

1. Reason 1 for Revocation

(1) Evidence A No. 1 and Invention A1

Evidence A No. 1 has the following description regarding a video encoding and decoding device. (Underlines are attached by the panel.)

(1-1) "Therefore, in such a case, to avoid increasing amount of codes, in the related art, a method of encoding a motion vector by selecting a motion compensation method that minimizes the prediction error of a small block to be encoded is known among a plurality of motion compensation methods. Here, as an example of such an encoding method, there is an encoding method that has two motion compensation methods assuming two different types of motion models, a translation motion model and a translation + scaling model, and selects one of the motion compensation methods for encoding.

Here, Figs. 9(a) and 9(b) show examples of the translation motion model and the translation + scaling motion model, respectively. The translation motion model shown in Fig. 9(a) is a motion model that expresses the motion of the subject by the translation component (x, y). The translation + scaling motion model shown in Fig. 9(b) is a motion model that expresses the motion of the subject by (x, y, z), which includes not only the translation component (x, y) but also the added parameter z indicating the amount of enlargement or reduction of the subject. In the example of the translation + scaling motion model shown in Fig. 9(b), the parameter z of the motion vector is a value representing reduction." (page 2, lines 15 to 29)

(1-2) "Hereinafter, the component of the encoder using the global motion compensation and the flow of processing will be briefly described with reference to Fig. 11.

First, a picture 31 for encoding is input to the global motion detector 34, where the global motion parameter 35 for the entire frame is obtained" (page 4, lines 21 to 25)

(1-3) "The global motion parameter 35 obtained by the global motion detector 34 is input to the global motion compensator 36 together with the reference picture33 stored in the frame memory 32. The global motion compensator 36 causes the motion vector for each pixel obtained from the global motion parameter 35 to act on the reference picture 33 to generate the global motion compensation predicted picture 37.

The reference picture 33 stored in the frame memory 32 is input to the local motion detector 38 together with the input picture 31. The local motion detector 38 detects the motion vector 39 between the input picture 31 and the reference picture 33 for each macroblock of 16 pixels × 16 lines. The local motion compensator 40 generates a local motion compensation predicted picture 41 from the motion vector 39 for each macroblock and the reference picture 33. This is the motion compensation method used in MPEG and the like.

Next, the encoding mode selector 42 selects one of the global motion compensation predicted picture 37 and the local motion compensation predicted picture 41, which has a smaller error from the input picture 31, for each macroblock. In the macroblock for which the global motion compensation is selected, the motion vector 39 is not encoded since the local motion compensation is not performed. The predicted picture 43 selected by the encoding mode selector 42 is input to the subtractor 44, and the difference picture 45 between the input picture 31 and the predicted picture 43 is converted into a DCT coefficient 47 by the DCT unit 46. Next, the DCT coefficient 47 is converted into a quantization index 49 by the quantizer 48. After the quantization index 49 is encoded by the quantization index encoder 57, the encoding mode selection information 56 is encoded by the encoding mode encoder 58, the motion vector 39 is encoded by the motion vector encoder 59, and the global motion parameter 35 is encoded by the global motion parameter encoder 60, they are multiplexed to be an output of the encoder." (page 5, line 21 to page 6, line 15)

(1-4) "Therefore, the correlation between the motion vector of the translation motion model and the motion vector of the translation + scaling motion model will be considered with reference to the motion vector shown in Fig. 10. In Fig. 10, in performing motion compensation for the current small blocks Boa and Bob to be encoded, motion compensation is performed on the current small block Boa to be encoded with reference to the small block Bra included in the reference frame by a motion compensation method assuming the translation motion model, and motion compensation is performed on the current small block Bob to be encoded with reference to the small block Brb included in the reference frame by a motion compensation method assuming the translation + scaling motion model.

In this case, the motion vector va = (xa,ya) (note: to be correct, there is → above va, and the same applies below) in Fig. 10 is the translation motion model, and vb=(xb,yb,zb) (note: to be correct, there is → above vb, and the same applies below) is the translation + scaling motion model. In this case, in the motion compensation of the current small block Bob to be encoded, small block Brb included in the reference frame is enlarged and referred to. Therefore, in the motion vectors va and vb shown in Fig. 10, the translation components have almost the same value, indicating that there is redundancy.

However, according to the method in the related art, since a motion vector of a motion model different from a certain motion vector is not predicted from the motion vector of the certain motion model, the redundancy between the motion vectors with different motion models cannot be reduced." (page 8, lines 2 to 19)

(1-5) "In MPEG-4 above-mentioned, predictive encoding is adopted in order to efficiently encode the motion vector. For example, the operation of the motion vector encoder 59 in Fig. 11 is as follows. That is, as shown in Fig. 13, the vector MV of the current block refers to the motion vector MV1 of the left block, the motion vector MV2 of the block directly above, and MV3 of the diagonally upper right block, and a median of these vectors is taken as a predicted value of the vector MV. Assuming that the predicted value of the vector MV of the current block is PMV, PMV is defined by the following equation (7).

PMV = median (MV1, MV2, MV3) …… -(7)

, If the motion vector does not exist because the reference block is in the intra-frame encoding mode, the median is obtained by setting the vector value at the corresponding position to 0. Further, If the motion vector does not exist also because the reference block is predicted by the global motion compensation, the median is calculated with the vector value at the corresponding position as 0. For example, if the left block uses the local motion compensation, the block directly above uses the global motion compensation, and the diagonally upper-right block uses the in-frame encoding mode, MV2 = MV3 = 0. Further, when all three reference blocks use the global motion compensation, MV1 = MV2 = MV3 = 0, and the median of these vectors is also 0. In this case, the motion vector of the current block is equivalent to not predictively encoding, and the encoding efficiency is lowered." (page 8, line 21 to page 9, line 9)

(1-6) "Moreover, in MPEG-4, seven codes of the ranges of the local motion vector are defined in [Table 1] by numbers 1 to 7, and each number indicates to the decoder which range is used with the code word in the bit stream called "fcode".

Table 1

fcode	range of motion vector
1	-16 to +15.5 pixels
2	-32 to +31.5 pixels
3	-64 to +63.5 pixels
4	-128 to +127.5 pixels
5	-256 to +255.5 pixels
6	-512 to +511.5 pixels

7	-1024 to +1023.5 pixels

However, since the global motion parameter in MPEG-4 can take a wide range of −2048 to +2047.5, the motion vector obtained from the global motion vector can also take a value of −2048 to +2047.5. However, the range of the local motion vector is smaller than the range, and the predicted vector thereof may have a large error. For example, when fcode = 3, the motion vector of the current block is (V_x, V_y) = (+48, +36.5), and the predicted vector obtained from the global motion vector is (PV_x, PV_y) = (+102, +75). In this case, the prediction error is (MVD_x, MVD_y) = (-54, -38.5), and an absolute value thereof becomes larger than the original (V_x, V_y). The smaller the absolute value of the prediction error (MVDx,MVDy), the shorter the length of the code word assigned to the prediction error. Therefore, there is a drawback that the code amount is conversely increased by the motion vector prediction.

Therefore, an object of the present invention is to provide motion vector predictive encoding and decoding methods that reduce the amount of generated codes of a motion vector and improve efficiency of motion vector prediction, predictive encoding and decoding devices, and a computer-readable recording medium on which motion vector predictive encoding and decoding programs are recorded." (page 9, line 11 to page 10, line 13)

(1-7) "In addition, when predicting the motion vector of the current small block to be encoded for which the local motion compensation is selected from the global motion parameter, when the magnitude of the predicted vector exceeds a predetermined range, the predicted vector is clipped within the predetermined range. Alternatively, when predicting the motion vector of the block for which the local motion compensation is selected from the global motion parameter, when the magnitude of the predicted vector exceeds a predetermined range, the predicted vector is set to zero." (page 12, lines 3 to 8)

(1-8) "When the predicted vector obtained from the global motion parameter exceeds the range of the local motion vector, the predicted vector is clipped to a minimum or a maximum value thereof. Therefore, for example, when fcode = 3 (the range of the motion vector is -64 to +63.5 pixels), the motion vector of the current block is (V_x, V_y) = (+48, +36.5), and the predicted vector obtained from the global motion parameter is (PV_x, PV_y) = (+102, +75), so that the predicted vector is clipped to (PV_x, PV_y) = (+63.5, +63.5). The prediction error (MVD_x, MVD_y) = (-15.5, -27), and the absolute value thereof is smaller than (-54, -38.5), which is obtained by the method in the related art. The code word assigned to the difference of the motion vector has a shorter word length as the absolute value becomes smaller, so that the total code word amount can be reduced.

In the case of the method of clearing the predicted vector to zero, for example, when fcode = 3 (the range of the motion vector is -64 to +63.5 pixels), the motion vector of the current block (V_x, V_y) = (+48, +36.5), and the predicted vector obtained from the global motion parameter (PV_x, PV_y) = (+102, +75), the predicted vector is cleared to (PV_x, PV_y) = (0, 0). The prediction error (MVD_x, MVD_y) = (+48, +36.5), and although an absolute value of the prediction error is larger than that of (-15.5, -27) in the clip method, the absolute value is smaller than that of (-54, -38.5) in the method in the related art.

As yet another example, a case where fcode = 1 (the range of the motion vector is -16 to +15.5 pixels) is considered. In this case, the motion vector of the current block is (V_x, V_y) = (+3, +1.5), and the predicted vector obtained from the global motion parameter is (PV_x, PV_y) = (+102, +75). In the clip method, the predicted vector is (PV_x, PV_y) = (+15.5, +15.5), and the prediction error (MVD_x, MVD_y) = (-12.5, -14). Meanwhile, in the zero clear method, the predicted vector is (PV_x, PV_y) = (0,0), and the prediction error (MVD_x, MVD_y) = (+3, +1.5). In this example, the absolute value can be made smaller in the zero clear method than in the clip method." (page 13, line 19 to page 14, line 18)

(1-9)

"

図 9

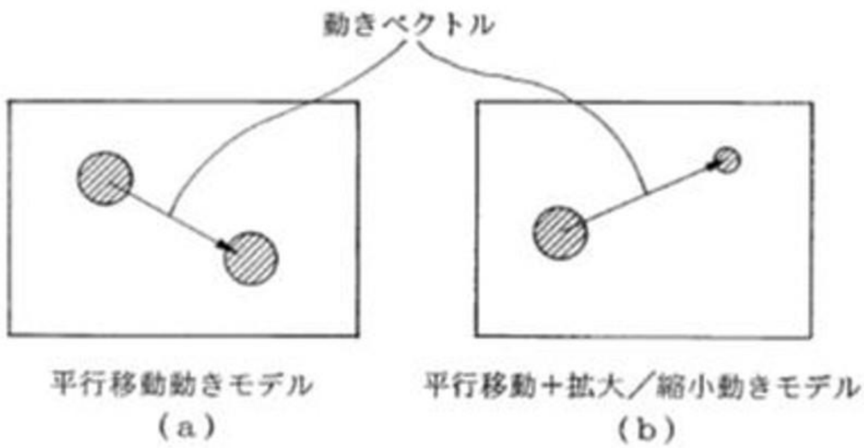


図 9	Fig. 9
動きベクトル	motion vector
平行移動動きモデル	translation motion model (a)
平行移動+拡大/縮小動きモデル	translation+ scaling motion model (b)

図１０

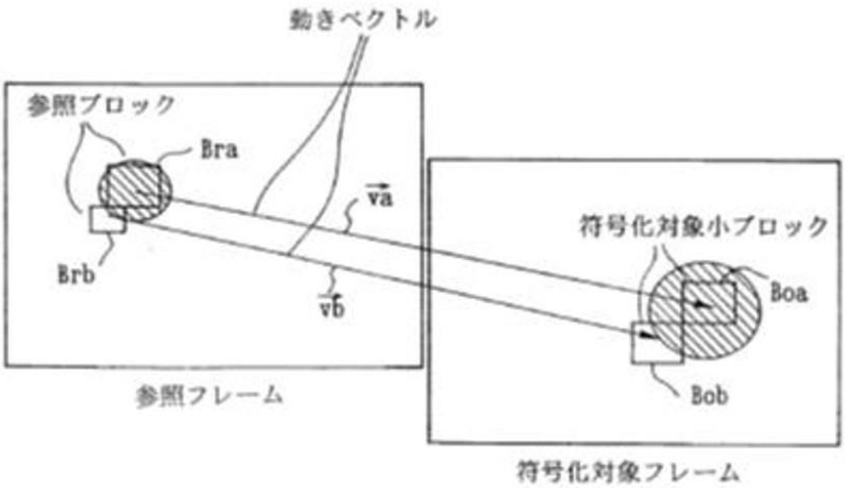


図10	Fig. 10
動きベクトル	motion vector(va,vb)
参照ブロック	reference block(Bra,Brb)
参照フレーム	reference frame(left figure)
符号化対象小ブロック	small block to be encoded(Boa,Bob)
符号化対象フレーム	frame to be encoded(right figure)

"

From the above description, it is specified that the following invention (hereinafter referred to as Invention A1) is described in Evidence A No. 1. (The signs correspond to the signs of the Invention 2).

(Invention A1)

f2 A motion vector predictive encoding device that reduces the amount of generated codes by a motion vector and improves efficiency of motion vector prediction (1-6), including:

a2, b2-1 an encoder using global motion compensation (1-2), in which

the picture 31 for encoding is input to the global motion detector 34, by which the global motion parameter 35 for the entire frame is obtained, (1-2)

the global motion parameter 35 obtained by the global motion detector 34 is input to the global motion compensator 36 together with the reference picture 33 stored in the frame memory 32, and the global motion compensator 36 causes the motion vector for each pixel obtained from the global motion parameter 35 to act on the reference picture 33 to generate the global motion compensation predicted picture 37,

the reference picture 33 stored in the frame memory 32 is input to the local motion detector 38 together with the input picture 31, the local motion detector 38 detects the motion vector 39 between the input picture 31 and the reference picture 33 for each macroblock, the local motion compensator 40 generates a local motion compensation predicted picture 41 from the motion vector 39 for each macroblock and the reference picture 33, and the encoding mode selector 42 selects, for each macroblock, one of the global motion compensation predicted picture 37 and the local motion compensation predicted picture 41 that has a smaller error from the input picture 31, (1-3)

b2-2, b2-3 the predicted picture 43 selected by the encoding mode selector 42 is input to the subtractor 44, the difference picture 45 between the input picture 31 and the predicted picture 43 is converted into a DCT coefficient 47 by the DCT unit 46, the DCT coefficient 47 is converted into a quantization index 49 by the quantizer 48, and after the quantization index 49 is encoded by the quantization index encoder 57 and the motion vector 39 is encoded by the motion vector encoder 59, they are multiplexed to be an output of the encoder, (1-3)

c2, d2 when predicting the motion vector of the current small block to be encoded for which the local motion compensation is selected from the global motion parameter, when the magnitude of the predicted vector exceeds a predetermined range, the predicted vector is clipped within the predetermined range or is set to zero, (1-7)

when the predicted vector obtained from the global motion parameter exceeds the range of the local motion vector, the predicted vector is clipped to the minimum value or the maximum value thereof, or the predicted vector will be cleared to zero, (1-8) and

e2 in the operation of the motion vector encoder 59, with reference to the motion vector MV1 of the left block, the motion vector MV2 of the block directly above, and MV3 of the diagonally upper-right block, a median of these vectors is taken as a predicted value of the vector MV of the current block. (1-5)

(2) Comparison between the Invention 2 and Invention A1

The Invention 2 is compared with Invention A1.

(a) According to the description of "reference picture 33 stored in the frame memory 32" in the components a2 and b2-1 of Invention A1, Invention A1 includes the "frame memory 32" that stores the "reference picture 33", and the "frame memory 32" corresponds to the "reference picture buffer that stores a reference picture" in the component A2 of the Invention 2.

(b1) According to the descriptions in the components a2 and b2-1 of Invention A1 that "the global motion parameter 35 is input to the global motion compensator 36 together with the reference picture 33 stored in the frame memory 32, and the global motion compensator 36 causes the motion vector for each pixel obtained from the global motion parameter 35 to act on the reference picture 33 to generate the global motion compensation predicted picture 37," "the reference picture 33 stored in the frame memory 32 is input to the local motion detector 38 together with the input picture 31, the local motion detector 38 detects the motion vector 39 between the input picture 31 and the reference picture 33 for each macroblock, the local motion compensator 40 generates a local motion compensation predicted picture 41 from the motion vector 39 for each macroblock and the reference picture 33," and "selects, for each macroblock, one of the global motion compensation predicted picture 37 and the local motion compensation predicted picture 41 that has a smaller error from the input picture 31," the "global motion compensator 36" and the "local motion compensator 40" generate a motion compensation predicted picture from the reference picture and the motion vector, and correspond to the "motion compensation unit that generates a predicted block using the reference picture and a motion vector of the reference picture" of the component B2-1 of the Invention 2.

(b2) In the components b2-2 and b2-3 of Invention A1, it can be said that "the predicted picture 43 selected by the encoding mode selector 42 is input to the subtractor 44," so that "the difference picture 45 between the input picture 31 and the predicted picture 43" is obtained.

Thus, the "subtractor 44" generates the "difference picture 45 between the input picture 31 and the predicted picture 43," and corresponds to the "subtractor that subtracts the predicted block from a current block to generate a residual block" in the component B2-2 of the Invention 2.

(b3) In the components b2-2 and b2-3 of Invention A1, "the difference picture 45 between the input picture 31 and the predicted picture 43 is converted into a DCT coefficient 47 by the DCT unit 46, the DCT coefficient 47 is converted into a quantization index 49 by the quantizer 48, and after the quantization index 49 is encoded" by "the quantization index encoder 57," it becomes "an output of the encoder".

Thus, the "quantization index encoder 57" converts the "difference picture 45" into the "DCT coefficient 47" and then encodes the "quantization index 49" converted by the "quantizer 48" to obtain the "output of the encoder," and corresponds to the "entropy encoding unit that generates a bit stream by encoding a quantized conversion coefficient of the residual block" in the component B2-3 of the Invention 2.

(c)(d) According to the descriptions in the components c2 and d2 of Invention A1 that "when predicting the motion vector of the small block to be encoded for which the local motion compensation is selected from the global motion parameter, when the magnitude of the predicted vector exceeds a predetermined range, the predicted vector is clipped within the predetermined range or is set to zero," and "when the predicted vector obtained from the global motion parameter exceeds the range of the local motion vector, the predicted vector is clipped to the minimum value or the maximum value thereof, or the predicted vector will be cleared to zero," since the motion vector in the local motion compensation and the global motion compensation of Invention A1 is clipped in a predetermined range, and the clipped motion vector is used as a predicted vector, it can be said that in the components c2 and d2 of Invention A1, "the motion vector of the reference picture is clipped in a predetermined range," which is identical with the component C2 of the Invention 2, and "the clipped motion vector is used as a predicted motion vector to generate the predicted block," which is identical with the component D2 of the Invention 2.

(e) According to the description in the component e2 of Invention A1 that "with reference to the motion vector MV1 of the left block, the motion vector MV2 of the block directly above, and MV3 of the diagonally upper-right block, a median of these vectors is taken as a predicted value of the vector MV of the current block," the vector MV of the current block is a vector used as a predicted motion vector, and is common to "the motion vector of the reference picture" in the components E2 to E2-3 based on the components C2 and D2 of the Invention 2, in that it is a motion vector of a block selected from blocks that exist at a predetermined position with respect to the current block.

On the other hand, the Invention 2 is different from Invention A1 in that the component E2 of the Invention 2 includes the components E2-1 to E2-3, that is, "the motion vector of the reference picture is a motion vector of a block in the reference picture selected from a block that exists at the same position as a current block and a block that exists at a position that spatially corresponds to the current block," whereas

the "motion vector MV1 of the left block, the motion vector MV2 of the block directly above, and MV3 of the diagonally upper-right block" in the component e2 of Invention A1 are not motion vectors of the reference picture, and are not motion vectors of a block in the reference picture selected from a block that exists at the same position as a current block and a block that exists at a position that spatially corresponds to the current block.

(f) The "motion vector prediction encoding device" in the component f2 of Invention A1 corresponds to the "video encoding device" in the component F2 of the Invention 2.

From the above, the corresponding features and different features between the Invention 2 and Invention A1 are as follows.

(Corresponding Features)

F2 An video encoding device, comprising:

A2 a reference picture buffer that stores a reference picture;

B2-1 a motion compensation unit that generates a predicted block using the reference picture and a motion vector of the reference picture;

B2-2 a subtractor that subtracts the predicted block from a current block to generate a residual block; and

B2-3 an entropy encoding unit that generates a bit stream by encoding a quantized conversion coefficient of the residual block, wherein

C2 the motion vector of the reference picture is clipped in a predetermined range,

D2 the clipped motion vector is used as a predicted motion vector to generate the predicted block, and

E2 the vector used as the predicted motion vector is a motion vector of a block selected from blocks that exist at a predetermined position with respect to the current block.

(Different Features)

With respect to the motion vector that is a vector used as the predicted motion vector, and of a block selected from blocks that exist at a predetermined position with respect to the current block,

it is the "motion vector of the reference picture" in the component E2 of the Invention 2 and includes the components E2-1 to E2-3. That is, the motion vector of the reference picture is

E2-3 a motion vector of a block in the reference picture selected from

E2-1 a block that exists at the same position as a current block, and

E2-2 a block that exists at a position that spatially corresponds to the current block.

However,

the "motion vector MV1 of the left block, the motion vector MV2 of the block directly above, and MV3 of the diagonally upper-right block," which are three vectors for constructing the predicted value, in Invention A1 are not the "motion vector of the reference picture," and are not the "motion vector of a block in the reference picture selected from a block that exists at the same position as a current block and a block that exists at a position that spatially corresponds to the current block."

(3) Judgment

Different Features will be discussed below.

The matter that "the motion vector of the reference picture is a motion vector of a block in the reference picture selected from a block that exists at the same position as a current block and a block that exists at a position that spatially corresponds to the current block" is not described in Evidence A No. 1 and cannot be said to be a mere well-known conventional technique or an obvious matter.

Therefore, the Invention 2 and Invention A1 cannot be said to be substantially the same invention.

In "(h-3) Comparison with Invention Described in Invention A1-2" of "a. Comparison with Invention A1-2" of "(B) Regarding the Invention 2" in "C. Reason 1 for Revocation" in "(4) Specific Reasons" in "4. Reasons for Opposition" in the written opposition, the opponent cites the above (1-1) and (1-5), and explains Figs. 9 and 10 related to the above (1-1) as follows. (page 78, line 7 to page 81, line 15 in the written opposition)

"In these parts, Figs. 9 and 10 describe a component in which the same subject moves or is enlarged or reduced as a translation and scaling motion model, and describe that the motion vector of the macroblock of the reference block at the position corresponding to the current macroblock of the same subject is used.

For example, when the same subject does not move, or when the same subject moves within one macroblock, the motion vector of the reference frame (reference picture) is a motion vector of a block that exists at the same position as a current block. When the same subject moves translationally by one macroblock or more without being enlarged or reduced as shown in Fig. 9(a), the motion vector of the reference frame (reference picture) is a motion vector of a block that exists at a position that spatially corresponds to the current block.

That is, in the description of Evidence A No.1, there is a description of the invention relating to that 'the motion vector of the reference picture is a motion vector of a block in the reference picture selected from a block that exists at the same position as a current block and a block that exists at a position that spatially corresponds to the current block.'"

However, the component described in Fig. 9 of Evidence A No. 1, in which the same subject moves or is enlarged or reduced as a translation and scaling motion model, merely shows that the same subject in the reference picture exists at almost the same position as the current picture when the same subject does not move, or when the same subject moves within one macroblock (in other words, when the same subject almost does not move).

In addition, (1-1), (1-5), and Fig. 9 of Evidence A No. 1 do not show that the motion vector of the same subject in the reference picture is used to predict the motion of the subject in the current picture, and also do not suggest that the motion of the current block is predicted using the motion vector of a block in the reference picture selected from a block that exists at the same position as the current block and a block that exists at a position that spatially corresponds to the position of the current macroblock of the same subject.

In addition, in relation to Fig. 10 of Evidence A No. 1, referring to the description in the above (1-4), it can only be understood from this description that there is a suggestion that the motion vector va used for motion compensation of the current small block Boa to be encoded and the motion vector vb used for motion compensation of the current small block Bob to be encoded have substantially the same translation component and have redundancy, and therefore, in order to reduce the redundancy of va and vb, va is predicted from the motion vector vb (or vb is predicted from the motion vector va).

There is no suggestion that in the reference picture of the block Boa or the block Bob, the motion vector va or vb is predicted using the motion vector of the block selected from a block at the same position as Boa or Bob or the block at the spatially corresponding position.

Therefore, the matters described in the above (1-1), (1-4), (1-5), Fig. 9, and Fig. 10 of Evidence A No. 1 do not satisfy the above difference.

2. Reason 2 for Revocation

In "(h-2) Description of Well-known Techniques" of "a. Comparison with Invention A1-2" of "(B) Regarding the Invention 2" in "C. Reason 1 for Revocation" in "(4) Specific Reasons" in "4. Reasons for Opposition" in the written opposition, the patent opponent explains as follows. (Page 75, line 1 to page 78, line 6 in the written opposition. Underlines are attached by the body.)

"As mentioned in (h-1), the constituent requirement E that 'a block that exists at the same position as a current block and a block that exists at a position that spatially corresponds to the current block' describes the technical matter of the collated block described in the

HEVC standard (and H.264/AVC standard that defines the same technical feature), which is the prior art described in paragraphs [0058] to [0060] of the description of the Patent, and is a well-known technique.

For example, it is also described on pages 128 to 131 shown below in Evidence A No. 2 which is a basic book explaining the standard of H.264/AVC showing the well-known technique.

4 Temporal Direct Mode

Figs. 5-20 shows the concept of temporal direct mode. In the direct mode, the reference picture with the smallest reference picture number in the L1 prediction is important, and is called an 'anchor picture.' Normally, the closest reference picture after the picture to be encoded in display order is the anchor picture. Also, the block of the anchor picture that is at the same spatial position as the block to be encoded is called an 'anchor block.'

In the temporal direct mode, the motion information of the anchor block is first checked, and the L0 motion vector of the anchor block is assumed as mvCol (MV of the Co-located block, motion vector of the same block). When the anchor block does not have the motion vector of L0 and has a motion vector of L1, the motion vector of L1 is assumed as mvCol.

The reference picture of L0 in the temporal direct mode is the picture referenced by mvCol, and the reference picture of L1 in the temporal direct mode is the anchor picture. When the anchor block is intra-frame encoded and has no motion information, the magnitude of the motion vector is 0, and the reference picture of L0 in the temporal direct mode is a picture having a reference picture number of 0 in the reference pictures of L0 (usually, the reference picture displayed immediately before the picture to be encoded in the display order).

C

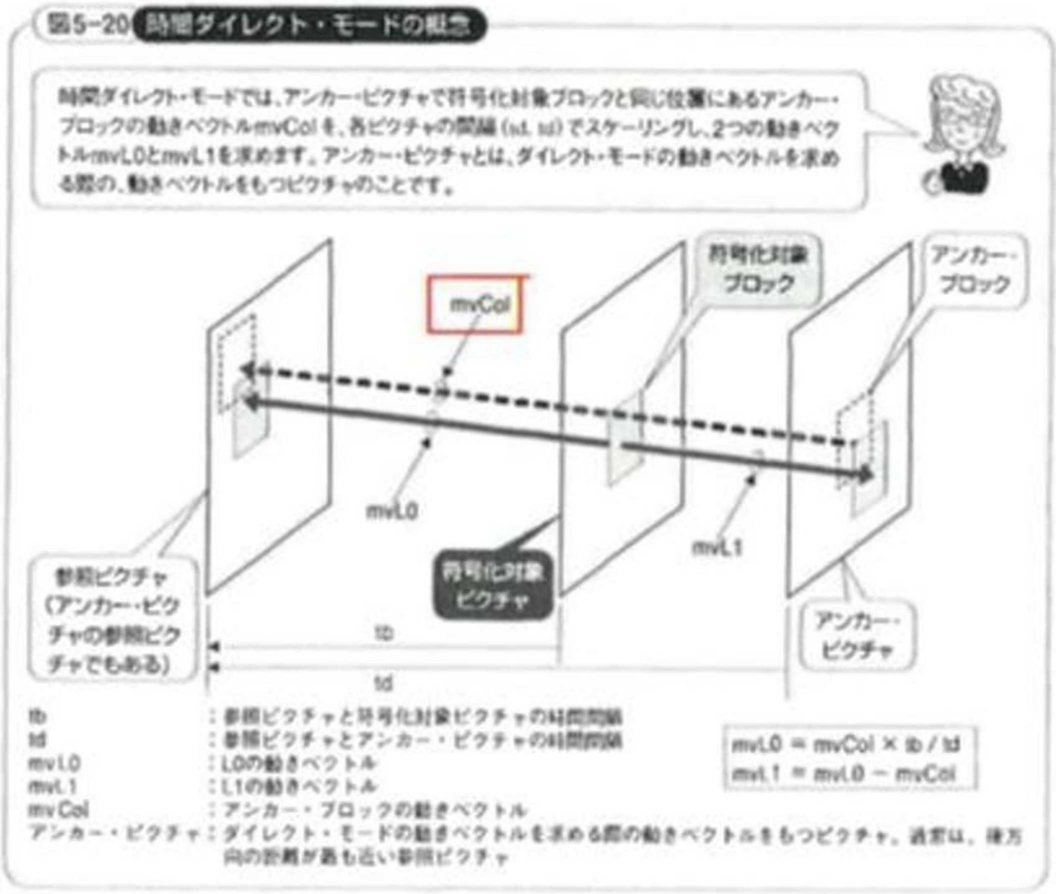


Fig.5-20 Concept of Temporal Direct Mode

Reference Picture :Left Rectangle

Current Picture :Central Rectangle

Anchor Picture :Right Rectangle

mvCol :Anchor block of anchor picture to reference picture

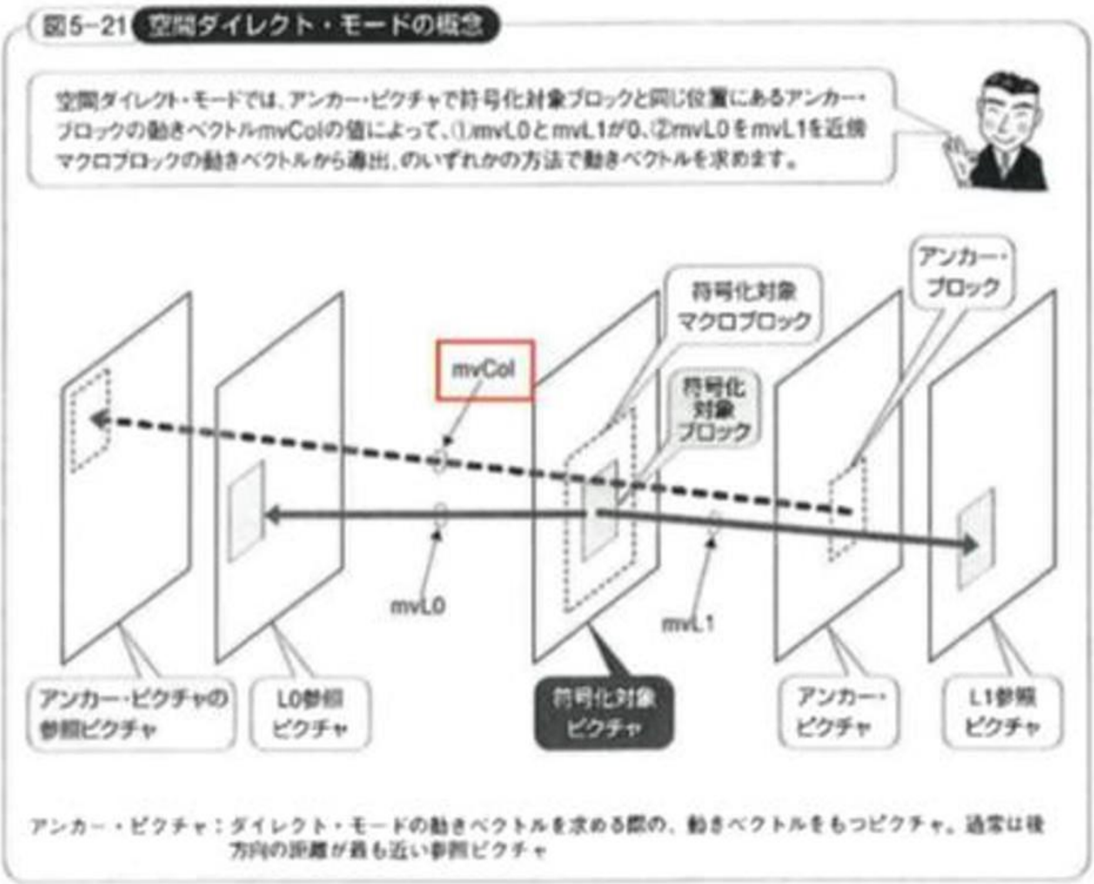


Fig.5-21 Concept of Spatial Direct Mode

Reference Picture of Anchor Picture :Leftmost Rectangle

L0 Reference Picture :Next to Reference Picture of Anchor Picture

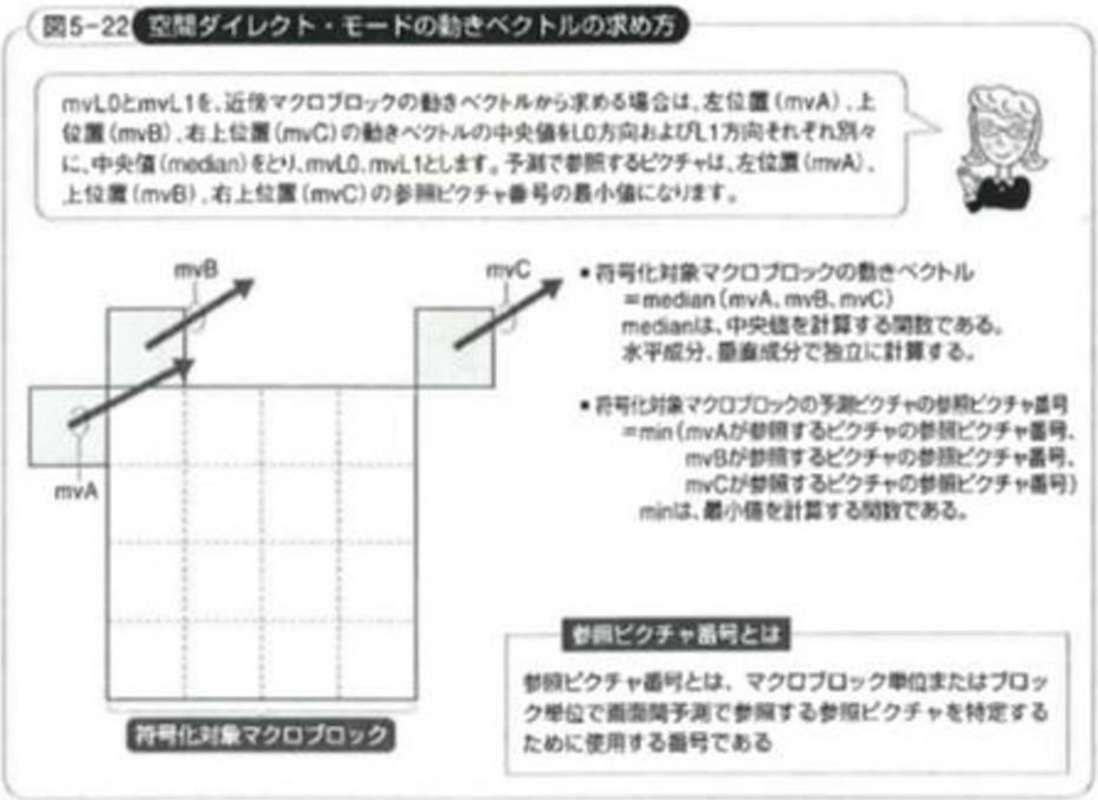
Current Picture :Central Rectangle

L1 Reference Picture :Rightmost Rectangle

Anchor Picture ;Next to L1 Reference Picture

mvCol :motion vector from Anchor Block in anchor picture to reference picture of anchor picture

Fig.5-22 Method for obtaining motion vector in Spatial Direct Mode



According to the description on pages 128 to 131 of Evidence A No. 2 showing this well-known technique, especially according to Figs. 5-20 to 5-22, it is described that the block of the reference picture pointed to by the motion vector mvCol of the Co-located block is 'a block that exists at collocated block of the current block and a block that exists at a position that spatially corresponds to the current block,' and this is a technical matter already specified in H.264/AVC standardized in 2003."

However, mvCol shown in Evidence A No. 2 is merely mvCol (MV of the Co-located block, motion vector of the same block) that is the "L0 motion vector" or the "L1 motion vector" of the "anchor block" in the "temporal direct mode," which is the "block of the anchor picture at the collocated position as the block to be encoded," for the "anchor picture," which is "the closest reference picture after the picture to be encoded in the display order."

In addition, "the reference picture of L0 in the temporal direct mode is a picture referenced by mvCol, and the reference picture of L1 in the temporal direct mode" is merely "an anchor picture."

Thus, mvCol shown in Evidence A No. 2 is the "motion vector of the reference picture" in the components E2 and E2-1 of the Invention 2 and indicates the "block that exists at collocated block of a current block," but is not the "predicted motion vector for generating the predicted block" in the component D2, which is the premise of the component E2, and it does not satisfy the components E2-2 and E2-3 of the above difference.

Furthermore, in "D. Reason 2 for Revocation" in "(4) Specific Reasons" in "4. Reasons for Opposition" in the written opposition, the patent opponent explains as follows. (page 111, line 13 to page 113, line 23 in the written opposition.)
"Even if it is determined that there is a difference between the Inventions 1 to 3 and Invention A1, the difference is merely a design change or a mere collection of well-known techniques, and does not exert a new effect. In addition, there is no hindrance to the combination thereof as long as they are in the technical field of video encoding and decoding

There are the following as evidences showing the well-known techniques. All of these well-known techniques disclose the same techniques related to the video encoding and decoding as in the Invention (decision note: "the Invention" is recognized as a general term for the Inventions 1 to 3).

Evidence A No. 2: Impress Standard Textbook Series Revised Third Edition H.264/AVC Textbook, 1st Edition, published January 1, 2009, Impress R&D Co., Ltd., p.86-87, p.128-131

Evidence A No. 3: "MPEG-4 Encoding Efficiency" by JYOZAWA Hironao, Proceedings of Winter Convention, Image Media Division, Institute of Television Engineers, published December 4, 1996, p.39-44

Evidence A No. 4: "HDTV High Compression Technology-Examination of Making MPEG-2 Bit Rate Lower" by OTSUKA Yoshimichi, NAITO Sei, INOMATA Hideki, Technical Report of the Institute of Image Information and Television Engineers, March 20, 2002, p.25-30

Evidence A No. 5: JP 2009-533901A

Evidence A No. 6: International Publication No. WO2008/136178

In the technical field of video encoding and decoding, it is a well-known technique before the priority date of the Patent, to limit (that is, clip) the range of magnitude of motion vector to reduce the processing load and the memory capacity.

Since the era of MPEG-2, a flag called f_code, which indicates the range of a magnitude of motion vector in a picture, has been defined as a standard, and it is a well-known matter that it is possible to adjust the range of the magnitude of motion vector defined by this f_code, and as a result, the capacity of the motion vector can be reduced.

For example, page 40 of Evidence A No. 3 describes that 'from VM2.0, the range expansion of motion vector using f_code is incorporated. The f_code is a technique that is also used for MPEG-1 and MPEG-2, and has the advantage of being able to flexibly change the range of the magnitude of motion vector according to the picture. (Omitted) As shown in Table 2, News and Coast have a small amount of motion, so f_code = 1 is sufficient. If f_code is increased, the performance will decrease conversely. This is because the originally unnecessary bits are added to each vector component by setting the f_code to 2 or 3, even though the motion of the range can be expressed without adding additional bits.'

That is, Evidence A No. 3 describes that there is a problem to be solved that if the range specified by f_code is taken too wide, the required capacity will increase conversely and the encoding efficiency will decrease, and as shown in Table 2, for videos with a small motion such as News, the amount of generated codes can be reduced by narrowing the range.

In addition, pages 29 to 30 of Evidence A No. 4 describe that “On the other hand, in MPEG-2, the search range of the motion vector can be defined by ’f_code’, and it is possible to switch the f_code by each picture. In this research, we propose a method of performing simple encoding at the stage of pre-encoding processing and adaptively switching f_code based on the distribution of motion vectors, and an experiment in which the f_code control condition is limited to the range of f_code that covers 80% of the number of vectors after measuring the statistics of the vector of each picture in encoding. As a result, this variable f_code can reduce the amount of vector information.”

In addition, paragraphs [0063] to [0081] of Evidence A No. 5 describe that the search range of the motion vector is switched, and the computation cost of motion prediction is reduced.

In addition, [Fig. 15] and paragraphs [0140] to [0148] of Evidence A No. 6 describe that the memory capacity is reduced by limiting the search range of motion vectors in the vertical and horizontal directions.

As described above, in the technical field of video encoding and decoding, it is a well-known technique to limit (that is, clip) the range of motion vectors to reduce the processing load and the memory capacity, and there is no technical advantage.

However, there is no description of the above difference, that is, the matter that "the motion vector of the reference picture is a motion vector of a block in the reference picture selected from a block that exists at the same position as a current block and a block that exists at a position that spatially corresponds to the current block," in each of these Evidence A.

Therefore, it cannot be said that Evidence A No. 2 to Evidence A No. 6 describe the above difference, and it cannot be said that a person skilled in the art could have easily conceived of the component of the Invention 2 relating to the above difference even by applying the matters described in Evidence A No. 2 to Evidence A No. 6 to Invention A1, and therefore, the assertion by the opponent cannot be adopted.

3. Summary regarding the Invention 2

Therefore, the Invention 2 is not identical with Invention A1, and it cannot be said that the Invention 2 could have been easily made by a person skilled in the art based on Invention A1 and the matters described in Evidence A No. 2 to Evidence A No. 6.

4. Regarding the Inventions 1 and 3

The Invention 1 specifies an "video decoding device," which is a sub-combination with the "video encoding device" excluding the "subtractor" in the component B2-2 and the "entropy encoding unit" in the component B2-3 from the "video encoding device" of the Invention 2.

Then, when comparing and examining the Invention 1, which is the "video decoding device" that is a sub-combination with the above "video encoding device" and an invention relating to an "video decoding device" that is a sub-combination with Invention A1 (hereinafter referred to as Invention A1-2), it can be said that the two are different in the above difference.

According to the above 1.(3), since the difference is not described in Evidence A No. 1 and cannot be regarded as a mere well-known conventional technique or an obvious matter, the Invention 1 and Invention A1 cannot be said to be substantially the same invention.

According to the above 2., depending on Evidence A No. 2 to Evidence A No. 6, the above difference cannot be satisfied, and even if the matters described in Evidence A No.

2 to Evidence A No. 6 are applied to Invention A1, it cannot be said that a person skilled in the art could have easily conceived of the components of the Invention 1 relating to the difference.

Therefore, the Invention 1 is not identical with Invention A1-2, and it cannot be said that the Invention 1 could have been easily made by a person skilled in the art based on Invention A1-1 and the matters described in Evidence A No. 2 to Evidence A No. 6.

With respect to the invention in the product category of an "video encoding device" of the Invention 2, regarding the generation of prediction blocks, the Invention 3 specifies an invention in the method category of "a bit stream transmission method executable by an video encoding device," which excludes the "motion compensation unit" in the component B2-1 for generating the prediction block and the components B2-2 and B2-3 for subtraction and entropy encoding, and is added with "a step of transmitting a bit stream encoded based on the predicted block to an video decoding device" in the component B3-2.

Then, for the same reason as the Invention 2, the Invention 3 cannot be said to be substantially the same as an invention specified as an invention in the method category, which is "a bit stream transmission method" added with the "step of transmitting a bit stream encoded based on the predicted block to an video decoding device" regarding Invention A1 (hereinafter referred to as Invention A1-3), and it cannot be said that a person skilled in the art could have easily conceived of the Invention 3 based on Invention A1-3 and the matters described in Evidence A No. 2 to Evidence A No. 6.

5. Summary of Judgment by the Body

As described in the above 1 to 4, Reasons 1 and 2 (the Patent Act Article 113(2) for revocation that the patent according to the Inventions 1 to 3 was granted in violation of the Patent Act Article 29(1)(iii) or the Patent Act Article 29(2) and should be revoked do not exist.

V Closing

As described above, the patent according to the Inventions 1 to 3 cannot be revoked according to Reasons 1 and 2 for revocation and the evidences in the opposition stated in the written opposition.

Further, no other reason for revoking the patent according to the Inventions 1 to 3 is found.

Therefore, the decision shall be made as described in the conclusion.

September 27, 2021

Chief administrative judge: SHIMIZU, Masakazu
Administrative judge: KAWASAKI, Hiroshi
Administrative judge: IGARASHI, Tsutomu