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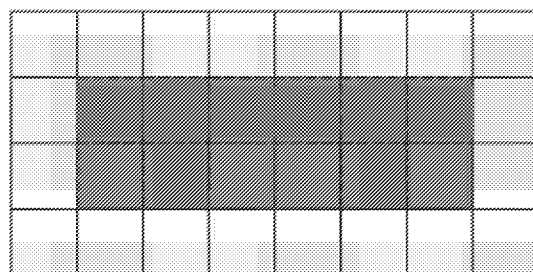
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(54) Title: MVD PRECISION FOR AFFINE

FIG. 26A



inner subblock



boundary subblock

(57) Abstract: Apparatus and methods for video processing are described. An exemplary method for video processing comprises determining a motion vector difference (MVD) precision for a current block processed with affine mode from an MVD precision set; performing, based on the determined MVD precision, a conversion between the current block and a bitstream representation of a video including the current block.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

INV. H04N19/109 H04N19/147 H04N19/174 H04N19/176 H04N19/52
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	"Algorithm description of Joint Exploration Test Model 7 (JEM7)", 119. MPEG MEETING;17-7-2017 - 21-7-2017; TORINO; (MOTION PICTURE EXPERT GROUP OR ISO/IEC JTC1/SC29/WG11),, no. N17055, 6 October 2017 (2017-10-06), XP030023716,	1-4, 7-13,34, 35
Y	section "2.3.2. Adaptive motion vector difference resolution"	5,6, 14-17
A	section "2.3.6. Affine motion compensation prediction" section "2.3.7.1. CU level MV candidate set" section "2.3.7.5. MV refinement" ----- -/--	18,19



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JIANLE CHEN ET AL: "Algorithm Description of Joint Exploration Test Model 7 (JEM 7)", JOINT VIDEO EXPLORATION TEAM (JVET) OF ITU-T SG 16 WP 3 AND ISO/IEC JTC 1/SC 29/WG 11, no. JVET-G1001-v1, 13 July 2017 (2017-07-13), - 21 July 2017 (2017-07-21), pages 1-51, XP055576095,	1,2,7, 12,34,35
Y	section "2.2.12 Affine motion compensation prediction", pages 19-21	14-17
A		3-6, 8-11,13, 18,19
X	----- ALSHIN A ET AL: "Description of SDR, HDR and 360° video coding technology proposal by Samsung, Huawei, GoPro, and HiSilicon" mobile application scenario", 10. JVET MEETING; 10-4-2018 - 20-4-2018; SAN DIEGO; (THE JOINT VIDEO EXPLORATION TEAM OF ISO/IEC JTC1/SC29/WG11 AND ITU-T SG.16); URL: HTTP://PHENIX.INT-EVRY.FR/JVET/,, no. JVET-J0024, 3 April 2018 (2018-04-03), XP030151189,	1-4
Y	section "3.1.4.3 Adaptive motion vector resolution", p. 51-52 section "3.1.4.5 Affine motion prediction", p. 54-57	5
Y	----- AN J ET AL: "Progressive MV Resolution", 97. MPEG MEETING; 18-7-2011 - 22-7-2011; TORINO; (MOTION PICTURE EXPERT GROUP OR ISO/IEC JTC1/SC29/WG11),, no. m20542, 15 July 2011 (2011-07-15), XP030049106,	5,6
A	section "1 Introduction" section "3.5 Threshold Adaptation at Slice Level" ----- -/--	1-4

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2019/056644

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	C-Y LAI ET AL: "CE4.3.4: Removal of AMVR flag constraint", 11. JVET MEETING; 20180711 - 20180718; LJUBLJANA; (THE JOINT VIDEO EXPLORATION TEAM OF ISO/IEC JTC1/SC29/WG11 AND ITU-T SG.16), , no. JVET-K0247 10 July 2018 (2018-07-10), XP030199299, Retrieved from the Internet: URL:http://phenix.int-evry.fr/jvet/doc_end_user/documents/11_Ljubljana/wg11/JVET-K0247-v2.zip JVET-K0247-v1.docx [retrieved on 2018-07-10] section "1 Algorithm description", paragraph on page 1 section "3 Conclusions" -----	1-19,34, 35
X,P	LIU (BYTEDANCE) H ET AL: "CE4-related: Adaptive Motion Vector Resolution for Affine Inter Mode", 12. JVET MEETING; 20181003 - 20181012; MACAO; (THE JOINT VIDEO EXPLORATION TEAM OF ISO/IEC JTC1/SC29/WG11 AND ITU-T SG.16), , no. JVET-L0332 5 October 2018 (2018-10-05), XP030194883, Retrieved from the Internet: URL:http://phenix.int-evry.fr/jvet/doc_end_user/documents/12_Macao/wg11/JVET-L0332-v2.zip JVET-L0332.docx [retrieved on 2018-10-05] abstract section "1 Introduction" section "2 Proposed method" -----	1-4,7,8, 11,12, 34,35
X,P	HE (INTERDIGITAL) Y ET AL: "CE4-related: Adaptive precision for affine MVD coding", 12. JVET MEETING; 20181003 - 20181012; MACAO; (THE JOINT VIDEO EXPLORATION TEAM OF ISO/IEC JTC1/SC29/WG11 AND ITU-T SG.16), , no. JVET-L0259 6 October 2018 (2018-10-06), XP030195077, Retrieved from the Internet: URL:http://phenix.int-evry.fr/jvet/doc_end_user/documents/12_Macao/wg11/JVET-L0259-v3.zip JVET-L0259-r2.docx [retrieved on 2018-10-06] abstract section "1 Introduction" -----	1-3,7,8, 11-19, 34,35

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2019/056644

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of Item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-19, 34, 35

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-19, 34, 35

Determining a motion vector difference (MVD) precision of a block processed with affine mode from an MVD precision set, and converting the current block accordingly, wherein the MVD precision set includes 1/4, 1/2, 1, 2 and 4 pixel MVD precisions or wherein different MVDs of the current block are associated with different MVD precisions.

1.1. claims: 1-11, 34, 35

Determining a motion vector difference (MVD) precision of a block processed with affine mode from an MVD precision set, and converting the current block accordingly, wherein the MVD precision set includes 1/4, 1/2, 1, 2 and 4 pixel MVD precisions.

1.2. claims: 12-19

Determining a motion vector difference (MVD) precision of a block processed with affine mode from an MVD precision set, and converting the current block accordingly, wherein different MVDs of the current block are associated with different MVD precisions.

2. claims: 20-23

Determining a motion vector difference (MVD) precision of a block processed with affine mode from an MVD precision set, and converting the current block accordingly, wherein a set of coarser or finer MVD precisions is selected for a larger or smaller quantization level, respectively.

3. claims: 24-33

Determining a motion vector difference (MVD) precision of a block processed with affine mode from an MVD precision set, and converting the current block accordingly, wherein the method is applied at a sub-block level depending on width and height of a block to which the sub-block belongs.
