

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
4 January 2007 (04.01.2007)

PCT

(10) International Publication Number  
WO 2007/002437 A3

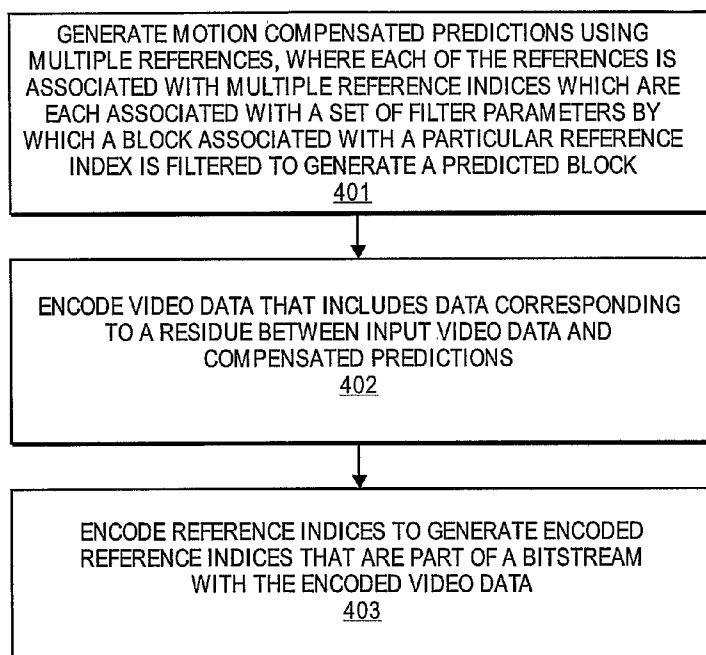
- (51) International Patent Classification:  
H04N 7/26 (2006.01) H04N 7/36 (2006.01)  
H04N 7/46 (2006.01)
- (21) International Application Number:  
PCT/US2006/024528
- (22) International Filing Date: 23 June 2006 (23.06.2006)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
60/693,575 24 June 2005 (24.06.2005) US  
11/452,043 12 June 2006 (12.06.2006) US
- (71) Applicant (for all designated States except US): NTT DO-COMO, INC. [JP/JP]; Sanno Park Tower, 11-1, Nagara-Cho, 2 Chome, Chiyoda-Ku, Tokyo, 100-6150 (JP).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): BOSSEN, Frank, Jan [NL/US]; San Jose, CA 95110 (US). TOURAPIS, Alexandros [—/US]; San Jose, CA 95110 (US).
- (74) Agents: MALLIE, Michael, J. et al.; Blakely, Sokoloff, Taylor & Zafman LLP, 12400 Wilshire Boulevard, 7th Floor, Los Angeles, CA 90025 (US).

- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

- Published:**
- with international search report
  - before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR VIDEO ENCODING AND DECODING USING ADAPTIVE INTERPOLATION



(57) Abstract: A method and apparatus is disclosed herein for video encoding and/or decoding using adaptive interpolation is described. In one embodiment, the decoding method comprises decoding a reference index; decoding a motion vector; selecting a reference frame according to the reference index; selecting a filter according to the reference index; and filtering a set of samples of the reference frame using the filter to obtain the predicted block, wherein the set of samples of the reference frame is determined by the motion vector.

WO 2007/002437 A3



---

**(88) Date of publication of the international search report:**

3 May 2007

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/US2006/024528

**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. H04N7/26 H04N7/46 H04N7/36

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 practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 03/058945 A2 (NOKIA CORP [FI]; NOKIA INC [US]) 17 July 2003 (2003-07-17) abstract; claim 4; figures 3,5,8,9 page 1, lines 7-12 page 4, lines 13-31 page 26, lines 3-29 page 5, lines 10-20 page 14, lines 15-19 page 21, lines 25-30	1-7
X	US 2004/076333 A1 (ZHANG HUIPIN [US] ET AL) 22 April 2004 (2004-04-22) abstract; figures 1-3,9-11 paragraphs [0001], [0011], [0036] - [0040]	1-7

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	"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
"E" earlier document but published on or after the international filing date	"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
"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)	"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.
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search <b>14 November 2006</b>	Date of mailing of the international search report <b>08. 03. 2007</b>
--	---

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer <b>Cakiroglu, Seda</b>
---	--

## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2006/024528

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WEDI T ED - INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS: "Adaptive interpolation filter for motion compensated prediction" PROCEEDINGS 2002 INTERNATIONAL CONFERENCE ON IMAGE PROCESSING. ICIP 2002. ROCHESTER, NY, SEPT. 22 - 25, 2002, INTERNATIONAL CONFERENCE ON IMAGE PROCESSING, NEW YORK, NY : IEEE, US, vol. VOL. 2 OF 3, 22 September 2002 (2002-09-22), pages II509-II512, XP002406860 ISBN: 0-7803-7622-6 abstract paragraphs [0002], [0003]	1
E	WO 2006/108654 A (UNIV HANNOVER [DE]; VATIS YURI [DE]; EDLER BERND [DE]; WASSERMANN INGO) 19 October 2006 (2006-10-19) abstract page 7, lines 16-24 page 8, lines 20-25 page 17, line 23 - page 18, line 6 page 21, line 1 - page 22, line 23	1-7
P,X	VATIS Y ET AL: "Motion-And Aliasing-Compensated Prediction Using a Two-Dimensional Non-Separable Adaptive Wiener Interpolation Filter" IMAGE PROCESSING, 2005. ICIP 2005. IEEE INTERNATIONAL CONFERENCE ON GENOVA, ITALY 11-14 SEPT. 2005, PISCATAWAY, NJ, USA, IEEE, 11 September 2005 (2005-09-11), pages 894-897, XP002406855 ISBN: 0-7803-9134-9 the whole document	1-7
A	SCHWARZ H ET AL: "Scalable Extension of H.264/AVC" ISO/IEC JTC1/CS29/WG11 MPEG04/M10569/S03, XX, XX, March 2004 (2004-03), pages 1-39, XP002340402 the whole document	1-7

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2006/024528

## Box 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 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 fee, this Authority did not invite payment of any additional fee.
  
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.:

1-7

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- 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: 1-7

claims 1-7 are directed to motion compensation using one or more references and filtering partitions or blocks of references to generate the predicted values, wherein each reference is associated with one or more indices each of which is associated with a set of filter parameters.

---

2. claims: 8-9

claims 8-9 relate to spatial scalable coding using adaptive fractional interpolation filtering of base layer to obtain enhancement layer wherein the filter for each block is indicated by a reference index associated to it.

---

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No <b>PCT/US2006/024528</b>
--

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 03058945	A2	17-07-2003	AU 2003201069 A1 24-07-2003
			BR 0304545 A 03-11-2004
			CN 1615645 A 11-05-2005
			EP 1466477 A2 13-10-2004
			HU 0500030 A2 28-07-2005
			JP 2005514872 T 19-05-2005
			MX PA04006814 A 06-12-2004
-----			
US 2004076333	A1	22-04-2004	JP 2004147328 A 20-05-2004
-----			
WO 2006108654	A	19-10-2006	NONE
-----			