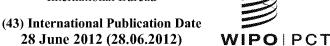
# (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau





(10) International Publication Number WO 2012/088357 A3

(51) International Patent Classification: *H04N 7/32* (2006.01)

(21) International Application Number:

PCT/US2011/066666

(22) International Filing Date:

21 December 2011 (21.12.2011)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

12/974,940 21 December 2010 (21.12.2010)

0) US

(71) Applicant (for all designated States except US): REAL-NETWORKS, INC. [US/US]; 2601 Elliott Avenue, Suite 1000, Seattle, WA 98121 (US).

(72) Inventors; and

- (75) Inventors/Applicants (for US only): PURI, Atul [US/US]; 2601 Elliott Avenue, Suite 1000, Seattle, WA 98121 (US). SOCEK, Daniel [US/US]; 2601 Elliott Avenue, Suite 1000, Seattle, WA 98121 (US). CHOI, Chang-Kee [US/US]; 2601 Elliott Avenue, Suite 1000, Seattle, WA 98121 (US).
- (74) Agent: PHILIPP, Adam L. K.; Aeon Law, 1218 3rd Ave, Ste 2100, Seattle, WA 98101 (US).

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

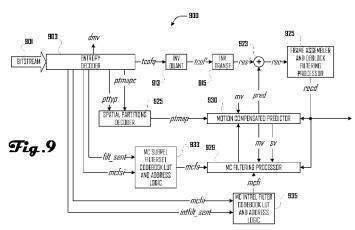
#### Published:

— with international search report (Art. 21(3))

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

27 December 2012

(54) Title: CONTENT ADAPTIVE MOTION COMPENSATION FILTERING FOR HIGH EFFICIENCY VIDEO CODING



(57) Abstract: A system and method for adaptive motion filtering to improve subpel motion prediction efficiency of interframe motion compensated video coding is described. The technique uses a codebook approach that is efficient in search complexity to look-up best motion filter set from a pre-calculated codebook of motion filter coefficient set. In some embodiments, the search complexity is further reduced by partitioning the complete codebook into a small base codebook and a larger virtual codebook, such that the main calculations for search only need to be performed on the base codebook.





International application No. **PCT/US2011/06666** 

# A. CLASSIFICATION OF SUBJECT MATTER

### H04N 7/32(2006.01)i

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 7/32; H04N 7/26; H04N 7/12; H04N 7/36

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS(KIPO internal) & Keywords: "adaptive motion compensation filter, codebook, sub-pel positions"

#### C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No	
A	US 2010-0220788 A1 (WITTMANN STEFFEN et al.) 02 September 2010 See abstract, Fig.6A,11 and page 9,[0164]-page 10,[0176].	1-23	
A	EP 2157799 A1 (PANASONIC CORPORATION) 24 February 2010 See abstract, Fig.4 and page 6,[0038]-page 7,[0051].	1-23	
A	US 2009-0022220 A1 (VATIS YURI et al.) 22 January 2009 See abstract and claim 1.	1-23	

		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 citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other
- "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
- "&" document member of the same patent family

Date of mailing of the international search report

Date of the actual completion of the international search

14 AUGUST 2012 (14.08.2012)

17 AUGUST 2012 (17.08.2012)

Name and mailing address of the ISA/KR



Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

KIM, Young Tae

Telephone No. 82-42-481-8367



# INTERNATIONAL SEARCH REPORT

natent family

International application No.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0220788 A1	02.09.2010	AU 2008-310494 A1	16,04,2009
00 2010 0220700 AT	02.03.2010	CA 2701758 A1	16.04.2009
		CN 101822061 A	01.09.2010
		EP 2048886 A1	15.04.2009
		EP 2187649 A1	19.05.2010
		KR 10-2010-0074137 A	01.07.2010
		WO 2009-047917 A1	16.04.2009
EP 2157799 A1	24.02.2010	CN 101828400 A	08.09.2010
		EP 2317770 A1	04.05.2011
		KR 10-2011-0042025 A	22.04.2011
		US 2010-0226432 A1	09.09.2010
		WO 2010-021108 A1	25.02.2010
US 2009-0022220 A1	22.01.2009	EP 1886502 A2	13.02.2008
		JP 2008-536414 A	04.09.2008
		WO 2006-108654 A3	10.05.2007