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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
16 October 2008 (16.10.2008)

PCT

(10) International Publication Number
WO 2008/122956 A2

(51) International Patent Classification:
H04N 7/36 (2006.01)

(21) International Application Number:
PCT/IB2008/051325

(22) International Filing Date: 8 April 2008 (08.04.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/910,783 9 April 2007 (09.04.2007) US

(71) Applicant *(for all designated States except US)*: **NOKIA CORPORATION** [FI/FI]; Keilalahdentie 4, FIN-02150 Espoo (FI).

(71) Applicant *(for LC only)*: **NOKIA, INC.** [US/US]; 6000 Connection Drive, Irving, TX 75039 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **UGUR, Kemal** [FI/FI]; Kuninkaankatu 5J 221, FIN-33210 Tampere (FI). **LAINEMA, Jani** [FI/FI]; Kisakentankatu 12 B 6, FIN-33230 Tampere (FI).

(74) Agent: **ALBERT, G., Peter**; Foley & Lardner LLP, 11250 El Camino Real, Suite 200, San Diego, CA 92130-2677 (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, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, 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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, 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:
— *without international search report and to be republished upon receipt of that report*

(54) **Title:** HIGH ACCURACY MOTION VECTORS FOR VIDEO CODING WITH LOW ENCODER AND DECODER COMPLEXITY

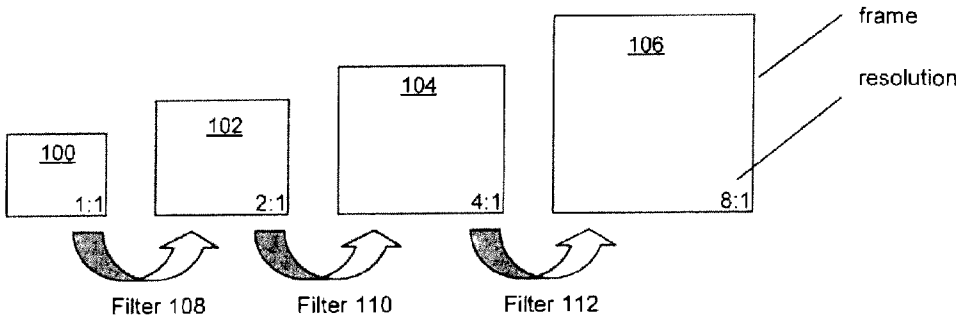


Figure 1

(57) **Abstract:** Two-stage interpolation can be provided for frame prediction samples with quarter- pixel and finer accuracy. All samples of quarter-pixel and finer accuracy can use either half or full/integer-pixels in a bi-linear interpolation to allow for the use of higher accuracy motion vectors, such as one-eighth-pixel accuracy motion vectors. The motion vectors can be restricted in a manner such that they are not allowed to point to every possible sub-pixel sample on a sub-pixel grid, but rather a subset of those sub-pixel samples. In addition, the same full/integer and half-pixel samples that can be used to obtain a quarter-pixel sample can also be used to obtain a one-eighth- pixel sample that the quarter-pixel sample is connected to. Hence, for every quarter- pixel sample, a motion vector could point to two additional positions/locations with one-eighth-pixel accuracy, where the two additional positions/locations can be calculated using the same half or integer-pixel samples which were used to obtain the quarter-pixel sample. Therefore, an arbitrary motion vector accuracy can be achieved without the need to perform additional interpolation stages or increase the complexity of a decoder configured to decode motion vector data.

WO 2008/122956 A2