

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
09 April 2020 (09.04.2020)



(10) International Publication Number
WO 2020/072579 A1

(51) International Patent Classification:
H04N 7/18 (2006.01)

(21) International Application Number:
PCT/US2019/054194

(22) International Filing Date:
02 October 2019 (02.10.2019)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/740,237 02 October 2018 (02.10.2018) US
62/863,362 19 June 2019 (19.06.2019) US

(71) Applicant: **FUTUREWEI TECHNOLOGIES, INC.**
[US/US]; 5700 Tennyson Parkway, Suite 600, Plano, Texas
75024 (US).

(72) Inventors: **ZAKHARCHENKO, Vladyslav**; 457 E. Evelyn Ave, Apt. 147, Sunnyvale, California 94086 (US).
CHEN, Jianle; 2330 Central Expressway, Santa Clara, California 95050 (US).

(74) Agent: **CARLSON, Craig E.** et al.; Fish & Richardson P.C., PO Box 1022, Minneapolis, Minnesota 55440 (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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,

(54) Title: MOTION ESTIMATION USING 3D AUXILIARY DATA

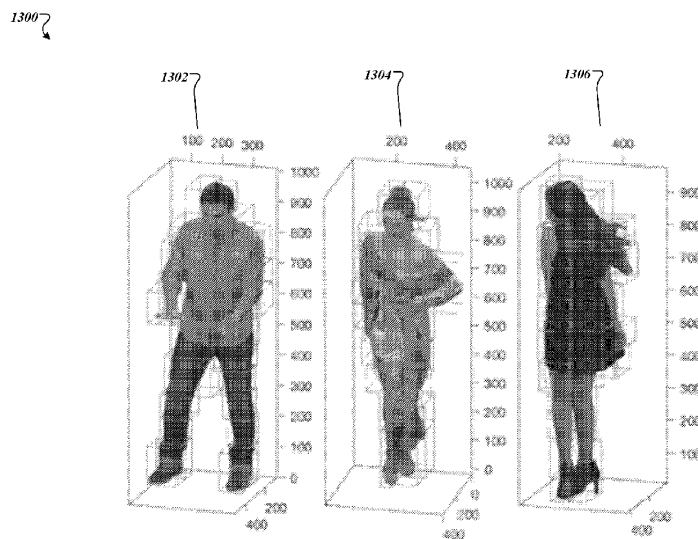


FIG. 13

(57) **Abstract:** Methods, systems, and apparatus, including computer programs encoded on computer storage media, for performing motion estimation. In some implementations, a method includes generating a segmentation of point cloud data based on continuity data of the point cloud data. A representation of the segmented point cloud data is projected onto sides of a three-dimensional bounding box. Patches are generated based on the projected representation of the segmented point cloud data. A first frame of the patches is generated. First and second auxiliary information is generated using the first frame and a reference frame. A first patch from the first frame is identified that matches a patch from the reference frame based on the first and second auxiliary information. A motion vector candidate is generated between the first and second patch based on a difference between the first and second auxiliary information. Motion compensation is performed using the motion vector candidate.

[Continued on next page]



WO 2020/072579 A1

SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, 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, KM, ML, MR, NE, SN, TD, TG).

Published:

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