



(51) International Patent Classification:
G06T 7/579 (2017.01)

(21) International Application Number:
PCT/GB2019/052215

(22) International Filing Date:
07 August 2019 (07.08.2019)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
1813197.9 13 August 2018 (13.08.2018) GB

(71) Applicant: **IMPERIAL COLLEGE OF SCIENCE,
TECHNOLOGY AND MEDICINE** [GB/GB]; South
Kensington Campus, Faculty Building, Exhibition Road,
London SW7 2AZ (GB).

(72) Inventors: **MCCORMAC, John Brendan**; 5 Killaney
Lane, Banbridge County Down BT32 3TA (GB). **CLARK,
Ronald**; 24 Queen's Gate Terrace, London SW7 5PH (GB).
BLOESCH, Michael; Flat 5, 7 Westbourne Terrace, Lon-
don W2 3UL (GB). **DAVISON, Andrew**; Department of
Computing, Huxley Building, 180 Queen's Gate, London
SW7 2RH (GB). **LEUTENEGGER, Stefan**; Flat 5, 7
Westbourne Terrace, London W2 3UL (GB).

(74) Agent: **EIP**; Fairfax House, 15 Fulwood Place, London
Greater London, WC1V 6HU (GB).

(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,

(54) Title: MAPPING OBJECT INSTANCES USING VIDEO DATA

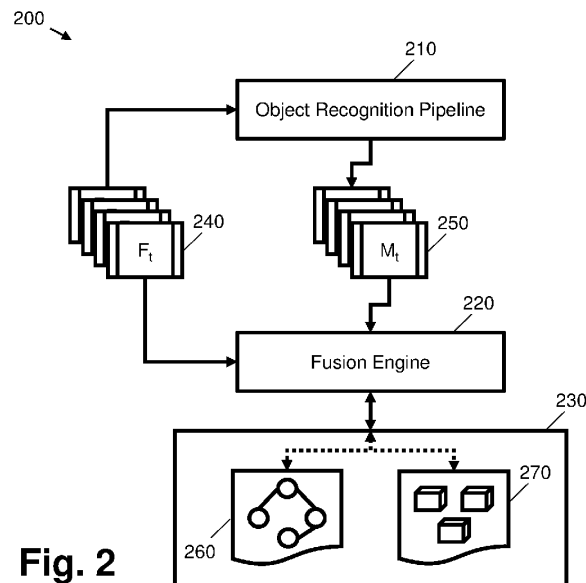


Fig. 2

(57) Abstract: A method comprising applying an object recognition pipeline to frames of video data. The object recognition pipeline provides a mask output of objects detected in the frames. The method includes fusing the mask output of the object recognition pipeline with depth data associated with the frames of video data to generate a map of object instances, including projecting the mask output to a model space for the map of object instances using a camera pose estimate and the depth data. An object instance in the map of object instances is defined using surface-distance metric values within a three-dimensional object volume, and has an object pose estimate indicating a transformation of the object instance to the model space. The object pose estimate and the camera pose estimate form nodes of a pose graph for the map of model instances.

[Continued on next page]

OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*