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15/012,694 1 February 2016 (01.02.2016) US
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[Continued on next page]

(54) **Title:** METHOD OF OBJECT MOTION TRACKING WITH REMOTE DEVICE FOR MIXED REALITY SYSTEM AND MIXED REALITY SYSTEM

(57) **Abstract:** Examples of mixed reality computing devices that utilize remote sensors and local sensors as input devices are disclosed. In one example, a mixed reality computing device comprises an image sensor, a remote input device, a processor, and storage comprising stored instructions. The stored instructions are executable by the processor to perform object motion tracking and environmental tracking based on output from the image sensor, and in response to detecting that the remote input device is in use, adjust a parameter of the motion tracking while maintaining the environmental tracking.

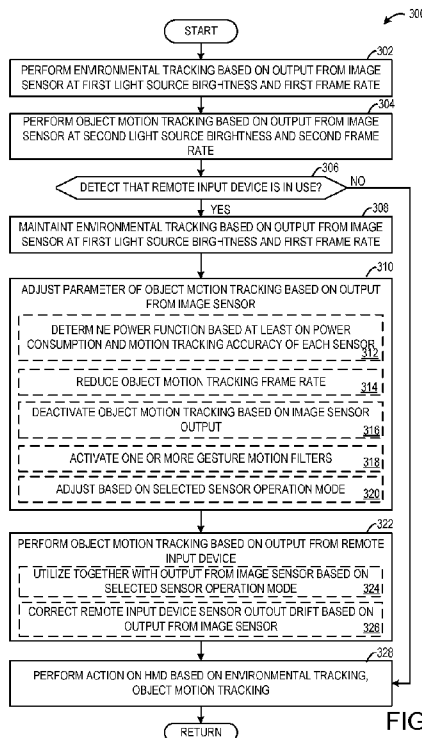
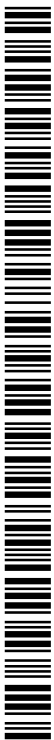


FIG. 3





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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).

(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, 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, 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.

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

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))

(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,

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

14 September 2017

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2017/013638

Box No. 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 No. 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 fees, this Authority did not invite payment of additional fees.

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.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No PCT/US2017/013638

A. CLASSIFICATION OF SUBJECT MATTER INV. G06F3/01 G06F3/0346 ADD.				
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) G06F				
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 practicable, search terms used) EPO-Internal, WPI Data				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
A	WO 2014/085757 A2 (MICROSOFT CORP [US]) 5 June 2014 (2014-06-05) paragraph [0017] paragraph [0001] - paragraph [0004] paragraph [0012] paragraph [0018] - paragraph [0019] paragraph [0023] paragraph [0027] paragraph [0029] paragraph [0070] paragraph [0071] paragraph [0098] ----- -/--	1-8		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.				
* Special categories of cited documents : <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> "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 another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 50%; border: none; vertical-align: top;"> "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 </td> </tr> </table>			"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 another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "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
"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 another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "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 the actual completion of the international search	Date of mailing of the international search report			
10 August 2017	18/08/2017			
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Fulcheri, Alessandro			

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2017/013638

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2016/025971 A1 (CROW WILLIAM M [US] ET AL) 28 January 2016 (2016-01-28) paragraph [0032] paragraph [0022] paragraph [0034] paragraph [0044] - paragraph [0045] paragraph [0048] paragraph [0066]	1-8
A	JP 2011 180867 A (BROTHER IND LTD) 15 September 2011 (2011-09-15) the whole document	1-8
A	WO 2014/200779 A2 (SONY COMP ENTERTAINMENT INC [JP]; MIKHAILOV ANTON [US]) 18 December 2014 (2014-12-18) paragraph [0001]; figures 1,2,12 paragraph [0004] paragraph [0014] paragraph [0032] - paragraph [0033] paragraph [0075]	1-8
A	US 2015/193018 A1 (VENABLE MORGAN KOLYA [US] ET AL) 9 July 2015 (2015-07-09) paragraph [0017] paragraph [0001] - paragraph [0003] paragraph [0058] - paragraph [0059] paragraph [0060] - paragraph [0062]	9-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2017/013638

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2014085757	A2	05-06-2014	CN 105144022 A 09-12-2015 EP 2926212 A2 07-10-2015 JP 2016502201 A 21-01-2016 KR 20150092226 A 12-08-2015 US 2014145914 A1 29-05-2014 WO 2014085757 A2 05-06-2014
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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-8

Mixed reality computing device adapted to perform object motion tracking and environmental tracking based on output from the image sensor and, in response to detecting that the remote input device is in use , adjust a power consumption-related parameter of the motion tracking while maintaining the environmental tracking,

2. claims: 9-15

Method of operating a mixed reality system based upon the calculation of power consumption of sensors.
