

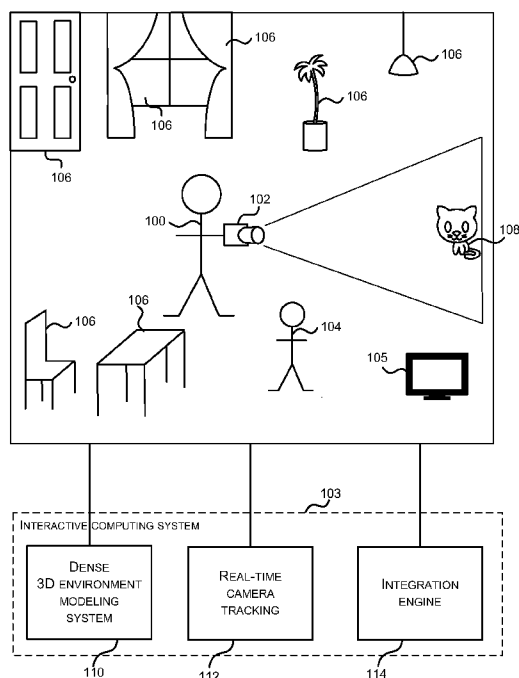


- (51) **International Patent Classification:**
A63F 13/00 (2006.01) A63F 13/04 (2006.01)
- (21) **International Application Number:**
PCT/US2012/020687
- (22) **International Filing Date:**
9 January 2012 (09.01.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
13/017,729 31 January 2011 (31.01.2011) US
- (71) **Applicant (for all designated States except US):** MICROSOFT CORPORATION [US/US]; One Microsoft Way, Redmond, Washington 98052-6399 (US).
- (72) **Inventors:** IZADI, Shahram; c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US). MOLYNEAUX, David; c/o Microsoft Corporation, LCA - International

Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US). HILLIGES, Otmar; c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US). KIM, David; c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US). SHOTTON, Jamie Daniel Joseph; c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US). KOHLI, Pushmeet; c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US). FITZGIBBON, Andrew; c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US). HODGES, Stephen Edward; c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US). BUTLER, David Alexander; c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US).

[Continued on next page]

- (54)
- Title:**
- USING A THREE-DIMENSIONAL ENVIRONMENT MODEL IN GAMEPLAY

**Fig. 1**

(57) **Abstract:** Use of a 3D environment model in gameplay is described. In an embodiment, a mobile depth camera is used to capture a series of depth images as it is moved around and a dense 3D model of the environment is generated from this series of depth images. This dense 3D model is incorporated within an interactive application, such as a game. The mobile depth camera is then placed in a static position for an interactive phase, which in some examples is gameplay, and the system detects motion of a user within a part of the environment from a second series of depth images captured by the camera. This motion provides a user input to the interactive application, such as a game. In further embodiments, automatic recognition and identification of objects within the 3D model may be performed and these identified objects then change the way that the interactive application operates.



(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, 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, 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).

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))

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

26 October 2012

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/020687**A. CLASSIFICATION OF SUBJECT MATTER****A63F 13/00(2006.01)i, A63F 13/04(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)

A63F 13/00; H04N 7/18; H04N 13/00; G06G 7/78; G06K 9/00

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: depth camera, 3D, track, application

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7860301 B2 (SHUEN YAN STEPHEN SE et al.) 28 December 2010 See abstract; column 7, line 55 - column 8, line 62; column 15, lines 20-26 and figures 1, 2.	1-10
A	US 2009-0231425 A1 (GARY ZALEWSKI) 17 September 2009 See abstract; paragraphs 27, 36, 53, 55 and figures 1, 7, 8.	1-10
A	US 6009359 A (SABRY F. EL-HAKIM et al.) 28 December 1999 See abstract; column 5, lines 5-15 and claim 1.	1-10
A	US 6781618 B2 (PAUL BEARDSLEY) 24 August 2004 See abstract; column 4, lines 45 - 60 and figure 1.	1-10



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 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

30 AUGUST 2012 (30.08.2012)

Date of mailing of the international search report

30 AUGUST 2012 (30.08.2012)

Name and mailing address of the ISA/KR

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

Facsimile No. 82-42-472-7140

Authorized officer

YANG, Jeong Rok

Telephone No. 82-42-481-5709



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/020687

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 7860301 B2	28.12.2010	US 2006-0221072 A1 US 2010-0098327 A1 US 2010-0098328 A1 US 8031909 B2 US 8031933 B2 WO 2006-084385 A1	05.10.2006 22.04.2010 22.04.2010 04.10.2011 04.10.2011 17.08.2006
US 2009-0231425 A1	17.09.2009	CN 102027434 A EP 2255269 A2 JP 2011-514232 A KR 10-1137646 B1 KR 10-2010-0125421 A WO 2009-117311 A2 WO 2009-117311 A3	20.04.2011 01.12.2010 06.05.2011 24.04.2012 30.11.2010 24.09.2009 04.03.2010
US 6009359 A	28.12.1999	CA 2215690 C WO 98-12504 A1	30.05.2006 26.03.1998
US 6781618 B2	24.08.2004	US 2003-025788 A1	06.02.2003