



(51) International Patent Classification:
G06K 9/00 (2006.01)

(21) International Application Number:
PCT/US2013/062261

(22) International Filing Date:
27 September 2013 (27.09.2013)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/707,671 28 September 2012 (28.09.2012) US
61/707,665 28 September 2012 (28.09.2012) US

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(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, 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, 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, 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, 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).

[Continued on next page]

(54) Title: SYSTEMS AND METHODS FOR THREE-DIMENSIONAL INTERACTION MONITORING IN AN EMS ENVIRONMENT

(57) Abstract: A method for tracking interactions in an emergency response environment according to embodiments of the present invention includes receiving color images and depth information from within a field of view of a sensor array; maintaining an emergency encounter record; monitoring one or both of a position of an object and movement of the object in the emergency response environment based on the color images and depth information received by the sensor array; and recording an occurrence of a condition in the emergency encounter record, wherein the condition is based on the one or both of the position of the object and the movement of the object.

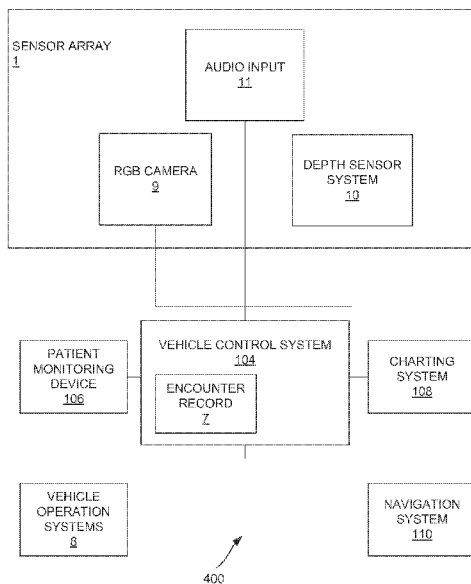


FIG. 4



Published:

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

31 July 2014

- *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))*

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2013/062261

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G06K 9/00 (2014.01)

USPC - 715/863

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)

IPC(8) - G06K9/00; G06K9/62; G06Q50/22 (2014.01)

USPC - 715/863; 382/103, 107, 154

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

CPC - G06F3/017; G06F3/04883; G06K9/00335; G06K9/00355 (2014.02)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase, Google Patents, Google Scholar

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2008/0170749 A1 (ALBERTSON et al.) 17 July 2008 (17.07.2008) entire document	1-20
A	US 2011/0227741 A1 (JEON) 22 September 2011 (22.09.2011) entire document	1-20
A	US 2006/0267781 A1 (COULTER) 30 November 2006 (11.30.2006) entire document	1-20
A	US 8,203,454 B2 (KNIGHT et al.) 19 June 2012 (19.06.2012) entire document	1-20
A	US 2011/0295078 A1 (REID et al) 01 December 2011 (01.12.2011) entire document	1-20

 Further documents are listed in the continuation of Box C.

* 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 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

16 May 2014

Date of mailing of the international search report

27 MAY 2014

Name and mailing address of the ISA/US

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PCT OSP: 571-272-7774

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 extra 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 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.:
1-20

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.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-20, drawn to a method for gesture recognition.

Group II, claims 21-32, drawn to a method for tracking interactions.

Group III, claims 33-36, drawn to a method for inventory control.

The inventions listed as Groups I, II and III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The special technical feature of the Group I invention: a method for gesture recognition in an emergency response environment, the method comprising: receiving visual information about at least a portion of a human body; monitoring the visual information to determine movements of the at least the portion of the human body; recognizing an occurrence of a gesture based on the movements of the at least the portion of the human body as claimed therein is not present in the invention of Groups II and III.

The special technical feature of the Group II invention: a method for tracking interactions in an emergency response environment, the method comprising: receiving color images and depth information from within a field of view; monitoring one or both of a position of an object and movement of the object in the emergency response environment based on the color images and depth information received by the sensor array as claimed therein is not present in the invention of Groups I or III.

The special technical feature of the Group III invention: a method for inventory control in an emergency response environment, the method comprising: detecting three-dimensional movement of a human body in the emergency response environment, wherein the sensor array generates visual information and depth information about the emergency response environment; detecting three-dimensional movement of an object in the environment; determining an occurrence of contact between the human body and the object as claimed therein is not present in the invention of Groups I or II.

Groups I, II and III lack unity of invention because even though the inventions of these groups require the technical feature of a method of recognition in an emergency response environment, receiving information about a portion of a human body from sensors, maintaining an emergency encounter record; monitoring the received information to determine movement of the at least the portion of the human body, and recording an entry in the emergency encounter record based on the information, this technical feature is not a special technical feature as it does not make a contribution over the prior art.

Specifically, US 2011/0295078 A1 (REID et al) 01 December 2011 (01.12.2011), teaches a method of recognition in an emergency response environment (A system for collecting and displaying emergency medical services information with patient monitoring device, abstract), receiving information about a portion of a human body from a sensor (The patient monitoring device 106 may be, for example, a defibrillator device with electrodes and/ or sensors configured for attachment to the patient 116 to monitor heart rate and/or to generate electrocardiographs ("ECG's"), according to embodiments of the present invention. The patient monitoring device 106 may also include sensors to detect or a processor to derive or calculate other patient conditions, para 0122, see fig. 1), maintaining an emergency encounter record (the BOA device 104 receives information from at least one patient monitoring EMS device and at least one non-patient monitoring EMS device. The patch notes screen of FIG. 6 illustrates one example of EMS information (e.g. information related to an emergency medical encounter or transport) from at least one patient monitoring device and at least one other device that does not directly monitor a patient (e.g. a navigation device and/or a patient charting device), para 0139); monitoring the received information to determine data of the at least the portion of the human body (The patient monitoring device 106 may be, for example, a defibrillator device with electrodes and/ or sensors configured for attachment to the patient 116 to monitor heart rate and/or to generate electrocardiographs ("ECG's"), according to embodiments of the present invention. The patient monitoring device 106 may also include sensors to detect or a processor to derive or calculate other patient conditions, para 0122, see fig. 1), and recording an entry in the emergency encounter record based on the information (e BOA device 104 receives information from at least one patient monitoring EMS device and at least one non-patient monitoring EMS device. The patch notes screen of FIG. 6 illustrates one example of EMS information (e.g. information related to an emergency medical encounter or transport) from at least one patient monitoring device and at least one other device that does not directly monitor a patient (e.g. a navigation device and/or a patient charting device), para 0139).

Since none of the special technical features of the Group I, II or III inventions are found in more than one of the inventions, unity of invention is lacking.