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[Continued on next page]

(54) Title: METHODS CIRCUITS DEVICES SYSTEMS AND ASSOCIATED COMPUTER EXECUTABLE CODE FOR MULTI FACTOR IMAGE FEATURE REGISTRATION AND TRACKING

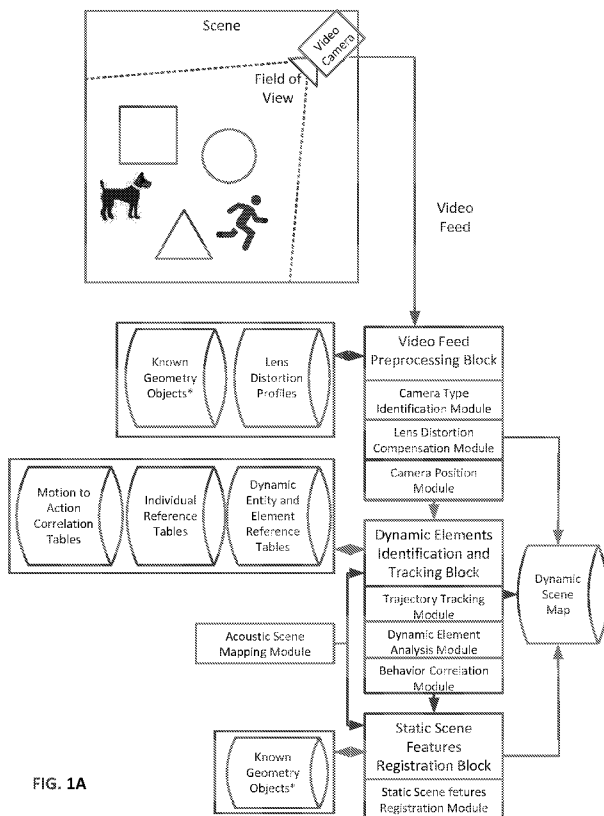


FIG. 1A

(57) Abstract: Disclosed are methods, circuits, devices, systems and associated executable code for Multi factor image feature registration and tracking, wherein utilized factors include both static and dynamic parameters within a video feed. Assessed factors may originate from a heterogeneous set of sensors including both video and audio sensors. Acoustically acquired scene information may supplement optically acquired information.





SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, KM, ML, MR, NE, SN, TD, TG).

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2016/053673

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - G06K 9/00; G08B 13/196; G01B 11/04; G06T 7/20 (2016.01) CPC - G06K 9/00369; G06K 9/00771; G08B 13/19615; G06F 17/3079 (2016.08) 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 - G06K 9/00; G08B 13/196; G01B 11/04; G06T 7/20 CPC - G06K 9/00369; G06K 9/00771; G08B 13/19615; G06F 17/3079 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched US: 348/61; 382/103; 348/47 (keyword delimited) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PatBase, Google Patents, ProQuest Search terms used: video feed, static, stationary, moving, motion, objects, tracking, 3D, scene, position		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013/0278727 A1 (TAMIR et al) 24 October 2013 (24.10.2013) entire document	1-6, 12, 23
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Y		7-11
Y	US 2006/0241529 A1 (HYNYNEN et al) 26 October 2006 (26.10.2006) entire document	7-11
A	WO 2013/154764 A1 (EASTERN VIRGINIA MEDICAL SCHOOL) 17 October 2013 (17.10.2013) entire document	1-12, 23
A	US 2014/0347479 A1 (GIVON) 27 November 2014 (27.11.2014) entire document	1-12, 23
A	WO 2013/167901 A1 (NCAM TECHNOLOGIES LIMITED) 14 November 2013 (14.11.2013) entire document	1-12, 23
A	US 2010/0268839 A1 (OLIVEREAU et al) 21 October 2010 (21.10.2010) entire document	1-12, 23
A	US 2010/0220188 A1 (RENKIS) 02 September 2010 (02.09.2010) entire document	1-12, 23
A	US 2008/0100704 A1 (VENETIANER et al) 01 May 2008 (01.05.2008) entire document	1-12, 23
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> 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 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 28 November 2016		Date of mailing of the international search report 19 DEC 2016
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, VA 22313-1450 Facsimile No. 571-273-8300		Authorized officer Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2016/053673

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 supplemental page

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.:
1-12, 23

- 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.

Continued from Box No. III Observations where unity of invention is lacking

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 1-12,23, drawn to a video feed processing system.

Group II, claims 13-20, drawn to a method of registering one or more features within an image frame of a video stream.

Group III, claim 21, drawn to a method of estimating distances of one or more features within an image frame of a live video feed.

Group IV, claims 22, drawn to a method of estimating a distance of one or more features within an image frame of an audio-video feed.

The inventions listed as Groups I, II, III or IV 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: update a scene element inventory with characterization information relating to identified static elements, wherein updating is performed responsive to either newly derived characterization information or to refinement of existing characterization information; detect from within the tracked and characterized moving elements one or more humans in the scene video feed; and characterize and log an event associated with a detected human as claimed therein is not present in the invention of Groups II, III or IV. The special technical feature of the Group II invention: tracking and parameterizing movement of detected dynamic edges across the consecutive series of image frames to generate a set of motion dynamic parameters; and correlating the motion dynamic parameters with a subject type and designating a pixel group adjacent to the one or more dynamic edges with the subject type as claimed therein is not present in the invention of Groups I, III or IV. The special technical feature of the Group III invention: detecting acoustic echo patterns and estimating distance of each pattern based on time of acoustic time of flight; and correlating at least one acoustic echo pattern estimated distance with an identified object within the image frame as claimed therein is not present in the invention of Groups I, II or IV. The special technical feature of the Group IV invention: calculating a temporal distance between acquisition of the frame with the object-action and the first timestamp; and estimating a physical distance of the object-action from a source device of the audio-video feed by multiplying an estimated speed of sound by the calculated temporal distance as claimed therein is not present in the invention of Groups I, II or III.

Groups I, II, III, and IV lack unity of invention because even though the inventions of these groups require the technical feature of estimating a distance of one or more features within an image frame of an audio-video feed, this technical feature is not a special technical feature as it does not make a contribution over the prior art.

Specifically, US 2010/0268839 A1 (OLIVEREAU et al) 21 October 2010 (21.10.2010) teaches estimating a distance of one or more features within an image frame of an audio-video feed (Paras. 44 and 46).

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