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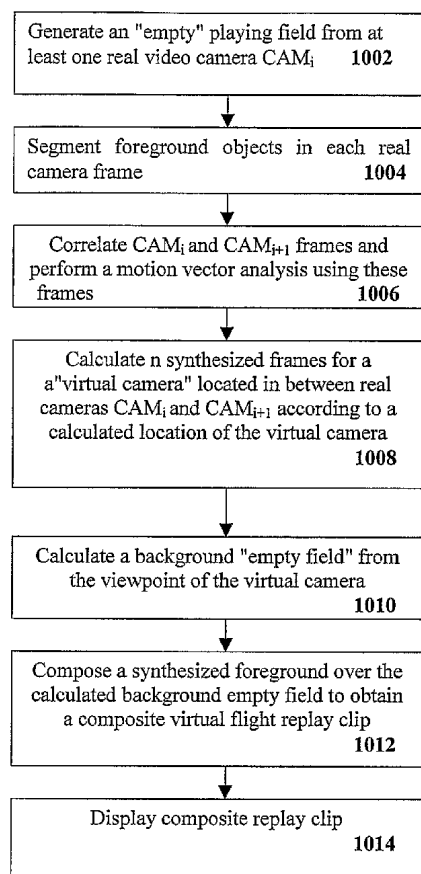
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[Continued on next page]

(54) Title: REAL-TIME OBJECTS TRACKING AND MOTION CAPTURE IN SPORTS EVENTS



(57) Abstract: Non-intrusive peripheral systems and methods to track, identify various acting entities and capture the full motion of these entities in a sports event. The entities preferably include players belonging to teams. The motion capture of more than one player is implemented in real-time with image processing methods. Captured player body organ or joints location data can be used to generate a three-dimensional display of the real sporting event using computer games graphics.

FIG. 10

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL06/00388

A. CLASSIFICATION OF SUBJECT MATTER

IPC: H04N 7/18(2006.01)

USPC: 348/153,154,155,157,159

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)

U.S. : 348/153,154,155,157,159; 382/2760

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Please See Continuation SheetElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
IEEE explorer, E-Journal, STIC, Google.**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,124,862 (Boyken et al.) 26 September 2000 (09.26.2000), column 2, line 19-column 7, line 64	1 and 38
Y	US 5,513,854 (Daver) 7 May 1996 (05.07.1996), column 2, line 14-column 6, line 11	2, 3, 5, 7, 8, 39, 40, 42, 43
A	US-PGPUB 2004/0109007 (Griss et al.) 10 June 2004 (06.10.2004), paragraph [0008], line 11- paragraph [0030], line 3	4
A	US 5,923,365 (Tamir et al.) 13 July 1999 (07.13.1999), column 1, line 25-column 11, line 55	6, 9, 43, 45
A	US-PGPUB 2004/0062450 (Kondo et al.) 01 April 2004 (04.01.2004), paragraph [0027], line 8- paragraph [0048], line 4.	41
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A	US 6,674,877 (Jojic et al.) 6 June 2004 (06.06.2004), column 2, line 14-column 9, line 1.	41

☐ 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	"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
"E" earlier application or patent published on or after the international filing date	"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
"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)	"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
"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	"&" document member of the same patent family

Date of the actual completion of the international search 29 July 2008 (29.07.2008)	Date of mailing of the international search report 25 August 2008 (25.08.2008)
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner of Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer Jingge Wu Telephone No. 571-272-2600

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL06/00388

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim 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. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation 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 fee, this Authority did not invite payment of any additional fee.
 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.
☐ No protest accompanied the payment of additional search fees.

BOX II. 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 1, claim(s) 1-9, and 38-45, drawn to method and system for locating and tracking in sports events.

Group 2, claim(s) 10-31, drawn to system for a personal identification of players

Group 3, claim(s) 32-36, 53-59, drawn to system for motion capture in sports event;

Group 4, claim(s) 37, and 60-61, drawn to system and method for generating a virtual flight clip (VFC) in sports event.

The invention listed as Groups 1-4 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 feature for the following reason:

The special technical feature of the Group 1 claims is the claimed method and system for locating and tracking in sports event and this feature is not present in Groups 2, 3, and 4. The special technical feature of the Group 2 claims is the claimed system for personal identification of players and this feature is not present in Groups 1, 3, and 4. The special technical feature of the Group 3 claims is the claimed system for motion capture in a sports event and this feature is not present in Groups 1, 2, and 4. The special technical feature of the Group 4 claims is the claimed system and method for generating a virtual flight clip (VFC) in sports event and this feature is not present in Groups 1, 2, and 3. Therefore unity of invention is lacking.

Continuation of B. FIELDS SEARCHED Item 2:

- The authoritative dictionary of IEEE Standards terms.
- Digital Motion Sequence, Video, and multi-Frame Processing (Majid Rabani, Eastman Kodak Research Laboratories)
- Digital image processing (Rafel C. Gonzalez; Richard E. Woods), second Edition.