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[Continued on next page]

(54) Title: SENSOR METHODS AND SYSTEMS FOR POSITION DETECTION

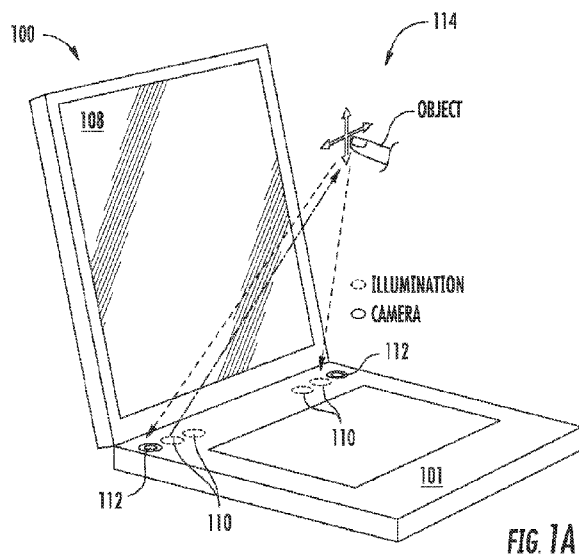


FIG. 1A

(57) Abstract: A computing device, such as a desktop, laptop, tablet computer, a mobile device, or a computing device integrated into another device (e.g., an entertainment device for gaming, a television, an appliance, kiosk, vehicle, tool, etc.) is configured to determine user input commands from the location and/or movement of one or more objects in a space. The object(s) can be imaged using one or more optical sensors and the resulting position data can be interpreted in any number of ways to determine a command. Signal conditioning logic (or a programmable CPU) can be used to facilitate detection by performing at least some image processing in hardware before the image is provided by the imaging device, such as by a hardware-implemented ambient subtraction, infinite impulse response (IIR) or finite impulse response (FIR) filtering, background-tracker-based touch detection, or the like.



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).

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/059078

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06F3/01 G06F3/03
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 practical, search terms used)

EP0-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.
X	US 2009/077504 A1 (BELL MATTHEW [US] ET AL) 19 March 2009 (2009-03-19) paragraphs [0019], [0023], [0029], [0036], [0038], [0041]; figure 1 -----	1-8, 11-17
A	SONSOLES HERRERO ET AL: "Background Subtraction Techniques: Systematic Evaluation and Comparative Analysis", 28 September 2009 (2009-09-28), ADVANCED CONCEPTS FOR INTELLIGENT VISION SYSTEMS, SPRINGER BERLIN HEIDELBERG, BERLIN, HEIDELBERG, PAGE(S) 33 - 42, XP019132083, ISBN: 978-3-642-04696-4 1 Introduction, first paragraph, last sentence; in conjunction with: 2.1 Basic Models, Frame differencing (FD) ----- -/--	1-8, 11-17



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 document 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

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/059078

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.:

1-8, 11-17

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/US2010/059078

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PICCARDI M ED - LIU W T ET AL: "Background subtraction techniques: a review", SYSTEMS, MAN AND CYBERNETICS, 2004 IEEE INTERNATIONAL CONFERENCE ON, IEEE, PISCATAWAY, NJ, USA, vol. 4, 10 October 2004 (2004-10-10), pages 3099-3104, XP010773231, ISBN: 978-0-7803-8566-5 abstract 1 Introduction, first paragraph -----	1-8, 11-17

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2010/059078

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009077504	A1	19-03-2009	
		AU 2008299883 A1	19-03-2009
		CA 2699628 A1	19-03-2009
		CN 101952818 A	19-01-2011
		EP 2188737 A1	26-05-2010
		JP 2010539590 A	16-12-2010
		KR 20100074180 A	01-07-2010
		WO 2009035705 A1	19-03-2009

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, 11-17

Optical movement detection system uses background subtraction method to obtain an image used to locate an object in a space.

2. claims: 9, 10, 18, 19

Power saving method for an optical movement detection system
