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[Continued on next page]

(54) Title: TOUCH-SENSITIVE DISPLAY DEVICES

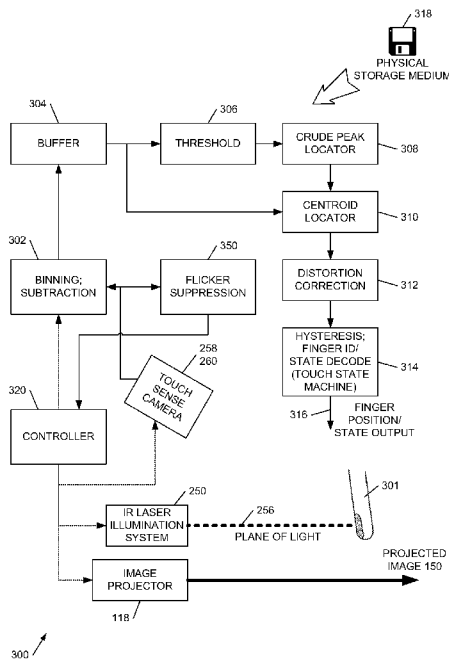


Figure 3

(57) Abstract: A touch sensitive device, the device comprising: a touch sensor light source to project a plane of light above a surface; a camera directed to capture a touch sense image from a region including at least a portion of said plane of light, said touch sense image comprising light scattered from said plane of light by an object approaching or touching said surface; and a signal processor coupled to said camera, to process a said touch sense image from said camera to identify a lateral location of said object; wherein said signal processor is further configured to: detect when an oscillatory component of ambient light captured by said camera has a frequency different to an integral multiple of a frame rate of said camera; and adjust said frame rate of said camera responsive to said detection to an adjusted frame rate, such that said oscillatory component of said ambient light captured by said camera has a frequency within 10% of an integral multiple of said adjusted frame rate.

WO 2012/172360 A3



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

— 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))

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INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/051379

A. CLASSIFICATION OF SUBJECT MATTER
 INV. G06F3/042 H04N5/353 H04N5/235 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 H04N

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 practicable, search terms used)
 EPO-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 2002/021287 A1 (TOMASI CARLO [US] ET AL) 21 February 2002 (2002-02-21) cited in the application paragraph [0001] - paragraph [0042]; figure 1A paragraphs [0045], [0101]	1-9, 11-13
A	US 2011/012866 A1 (KEAM NIGEL [US]) 20 January 2011 (2011-01-20) paragraph [0004] paragraph [0020] - paragraph [0024] paragraph [0061]	1-9, 11-13
A	US 2004/109069 A1 (KAPLINSKY MICHAEL [US] ET AL) 10 June 2004 (2004-06-10) abstract paragraph [0001] - paragraph [0005] paragraph [0041]	1-9, 11-13
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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 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

20 September 2012

Date of mailing of the international search report

11/01/2013

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2012/051379

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.: 10
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:
see FURTHER INFORMATION sheet PCT/ISA/210

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.:
1-9, 11-13

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/GB2012/051379

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007/153094 A1 (NOYES YING [US] ET AL) 5 July 2007 (2007-07-05) paragraph [0001] - paragraph [0056]; claim 7 -----	1-9, 11-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2012/051379

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002021287 A1	21-02-2002	US 2002021287 A1 US 2005024324 A1	21-02-2002 03-02-2005

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US 2007153094 A1	05-07-2007	CN 101366271 A EP 1969835 A2 JP 4809443 B2 JP 2009522948 A KR 20080085198 A US 2007153094 A1 WO 2007120944 A2	11-02-2009 17-09-2008 09-11-2011 11-06-2009 23-09-2008 05-07-2007 25-10-2007

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-9, 11-13

suppressing periodic noise in ambient light in a touch sensitive device comprising a camera

2. claims: 14-18

suppressing background illumination in a touch sensitive device comprising a camera

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 10

The wording of claim 10 lacks clarity (Article 6 PCT) to the extent that no meaningful search is possible. The term 'changes in average said ambient light level' is unclear and has no antecedent in claim 1, on which claim 10 may solely depend. It is further unclear whether the expression 'while identifying said object motion' refers to a time interval during which the light level changes or during which the processor performs the act of suppressing. Finally, the matter for which protection is sought is undefined in that the act of 'suppressing the effect of changes' is formulated as a result to be achieved and not in terms of technical features that achieve this effect (cf. Guidelines PCT 5.35).

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.2), should the problems which led to the Article 17(2) declaration be overcome.