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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, KM, 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, 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.

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Declarations under Rule 4.17:

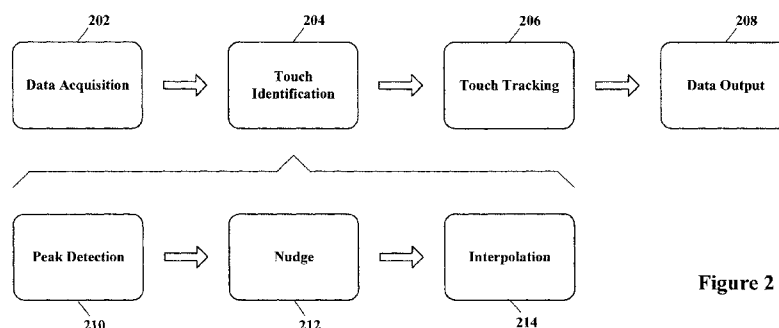
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- 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))

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

21 November 2013

(54) Title: METHOD AND SYSTEM FOR MULTI-TOUCH DECODING**Figure 2**

(57) **Abstract:** A touch sensor capable of detecting multiple touches thereto is coupled with a digital device having multi-touch decoding capabilities. These multi-touch decoding capabilities comprise touch data acquisition, touch identification, touch tracking and processed touch data output to a device associated with the touch sensor. Touch identification comprises touch location(s) peak detection, touch location(s) nudging and touch location(s) interpolation. Touch data acquisition locates potential touches on the touch sensor. Peak detection identifies where potential touch locations are on the touch sensor. Once a potential touch location(s) has been identified, touch location nudging examines each adjacent location thereto and interpolation examines the adjacent touch location values to generate a higher resolution location of the touch. Touch tracking compares time sequential "frames" of touch identification data and then determines which touches are associated between frames for further processing, e.g., determining gesturing actions.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/034635

A. CLASSIFICATION OF SUBJECT MATTER

INV. G06F3/041 G06F3/044
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 practicable, 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 2011/025629 A1 (GRIVNA EDWARD [US] ET AL) 3 February 2011 (2011-02-03)	1-3,5,12
Y	paragraphs [0031] - [0038]; figure 2 paragraphs [0043] - [0052]; figure 3A paragraphs [0057] - [0067]; figure 3B paragraphs [0086] - [0090]; figure 5	6,7
A	----- WO 2010/144152 A1 (CIRQUE CORP [US]; HILL JARED C [US]; WOOLLEY RICHARD D [US]) 16 December 2010 (2010-12-16) page 7, paragraph 2 - paragraph 3 page 8, paragraph 3	3,4
A	----- US 2011/157074 A1 (LIN KUN-CHIH [TW] ET AL) 30 June 2011 (2011-06-30) the whole document ----- -/-	3,4

☒ 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

10 June 2013

Date of mailing of the international search report

26/09/2013

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2008/309629 A1 (WESTERMAN WAYNE CARL [US] ET AL) 18 December 2008 (2008-12-18) paragraphs [0044] - [0051]; figure 4 -----	6,7
A	US 2009/174675 A1 (GILLESPIE DAVE [US] ET AL) 9 July 2009 (2009-07-09) the whole document -----	1-8,12
X	US 2011/175835 A1 (WANG WANQIU [SG]) 21 July 2011 (2011-07-21) the whole document -----	1,2,12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/034635

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, 12

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.

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, 12

a method for decoding multiple touches on a touch sensing surface, said method comprising the following steps:

- scanning a plurality of channels aligned on an axis for determining self values of the channels;
- scanning a plurality of nodes of the at least one channel that has the local maximum self value for determining mutual values of the nodes;
- determining a potential touch location.

2. claims: 9, 10

a method for tracking previously found and current touch locations on a touch sensing surface, said method comprising the steps of:

- determining if there is at least one previous touch location;
- determining if the previous touch location is associated with the current touch location.

3. claim: 11

a method for caching mutual touch values of a plurality of touch columns, said method comprising the steps of:

- receiving a mutual scan location request;
- determining if a cache memory contains scan data of the requested mutual scan location;
- determining if the requested mutual scan location is beyond a right edge of the cache memory.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/034635

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		WO 2011088726 A1	28-07-2011
