



- (51) **International Patent Classification:**
G06F 3/03 (2006.01) *G06F 3/041* (2006.01)
- (21) **International Application Number:**
PCT/US2012/027642
- (22) **International Filing Date:**
4 March 2012 (04.03.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/449,538 4 March 2011 (04.03.2011) US
13/156,243 8 June 2011 (08.06.2011) US
- (71) **Applicant (for all designated States except US): MICROSOFT CORPORATION** [US/US]; One Microsoft Way, Redmond, Washington 98052-6399 (US).
- (72) **Inventors: ZHAO, Weidong;** c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US). **STEVENS, David A.;** c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399

(US). **UZELAC, Aleksandar;** c/o Microsoft Corporation, LCA - International Patents, One Microsoft Way, Redmond, Washington 98052-6399 (US).

(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, 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, 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.

(84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, 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,

[Continued on next page]

(54) **Title:** MULTI-PASS TOUCH CONTACT TRACKING

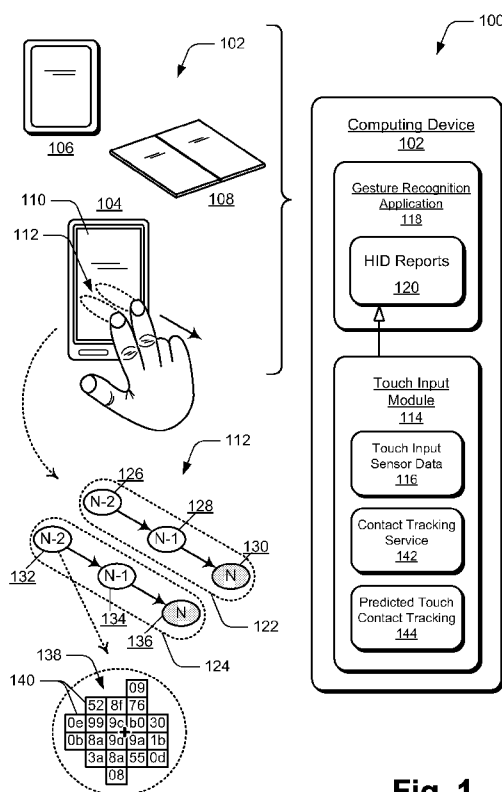


Fig. 1

(57) **Abstract:** In embodiments of multi-pass touch contact tracking, touch input sensor data is recognized as a series of components of a contact on a touch-screen display. The components can be determined to correlate to the contact based on multi-pass nearest-neighbor contact mapping that includes forward nearest-neighbor contact mapping of the components and reverse nearest-neighbor contact mapping of the components. The components can then be associated to represent a tracking of the contact. Subsequent components of the contact can also be determined and associated with the previous components of the contact to further represent the tracking of the contact.



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

Published:

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))

- 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:

15 November 2012

A. CLASSIFICATION OF SUBJECT MATTER**G06F 3/03(2006.01)i, G06F 3/041(2006.01)i**

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 3/03; G06F 3/044; G06F 3/041; H04N 7/14; G09G 5/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: touch, tracking, identity, associate, predict, nearest-neighbor

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6323846 B1 (WESTERMAN; WAYNE et al.) 27 November 2001 See abstract; column 19, line 14 - column 20, line 54; column 27, line 19 - column 29, line 32; claims 30-41; figures 16,22.	1-10
A	KR 10-2011-0011337 A (SAMSUNG ELECTRONICS CO., LTD.) 08 February 2011 See abstract; paragraphs 29-30,46-48,55-75; claims 1,4,6,9; figures 3-4,9.	1-10
A	KR 10-2008-0066416 A (SAMSUNG ELECTRONICS CO., LTD.) 16 July 2008 See abstract; paragraph 19; claim 1; figures 1-2,4,6.	1-10
A	KR 10-2005-0003155 A (KOREAVISUALS CO., LTD.) 10 January 2005 See abstract; claim 1; figure 1.	1-10



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 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

31 AUGUST 2012 (31.08.2012)

Date of mailing of the international search report

03 SEPTEMBER 2012 (03.09.2012)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

Jang, Gi Jeong

Telephone No. 82-42-481-5648



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/027642

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6323846 B1	27.11.2001	AU 1999-24673 A1	09.08.1999
		AU 1999-24673 B2	17.04.2003
		CA 2318815 A1	29.07.1999
		CA 2318815 C	10.08.2004
		EP 1058924 A1	13.12.2000
		EP 1058924 A4	24.08.2005
		EP 1717677 A2	02.11.2006
		EP 1717677 A3	02.01.2008
		EP 1717678 A2	02.11.2006
		EP 1717678 A3	21.01.2009
		EP 1717679 A2	02.11.2006
		EP 1717679 A3	04.02.2009
		EP 1717680 A2	02.11.2006
		EP 1717680 A3	24.03.2010
		EP 1717681 A2	02.11.2006
		EP 1717681 A3	14.01.2009
		EP 1717682 A2	02.11.2006
		EP 1717682 A3	16.04.2008
		EP 1717683 A2	02.11.2006
		EP 1717683 A3	17.03.2010
		EP 1717684 A2	02.11.2006
		EP 1717684 A3	23.01.2008
		EP 2256605 A2	01.12.2010
		EP 2256605 A3	04.01.2012
		EP 2256606 A2	01.12.2010
		EP 2256606 A3	14.12.2011
		EP 2256607 A2	01.12.2010
		EP 2256607 A3	14.12.2011
		IL 137478A	20.11.2005
		IL 137478D0	24.07.2001
		JP 2002-501271 A	15.01.2002
		JP 2007-184006 A	19.07.2007
		JP 2007-184007 A	19.07.2007
		JP 2007-184008 A	19.07.2007
		JP 2007-193840 A	02.08.2007
		JP 2007-213599 A	23.08.2007
		JP 2011-146067 A	28.07.2011
		JP 2012-099161 A	24.05.2012
		JP 2012-113761 A	14.06.2012
		JP 4763695 B2	31.08.2011
		JP 4767901 B2	07.09.2011
		JP 4990666 B2	01.08.2012
		KR 10-0595911 B1	07.07.2006
		KR 10-0595912 B1	07.07.2006
		KR 10-0595915 B1	05.07.2006
KR 10-2011-0011337 A	08.02.2011	None	
KR 10-2008-0066416 A	16.07.2008	None	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/027642Patent document
cited in search reportPublication
datePatent family
member(s)Publication
date

KR 10-2005-0003155 A

10.01.2005

None