

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
23 October 2008 (23.10.2008)

PCT

(10) International Publication Number
WO 2008/125799 A3

- (51) International Patent Classification:
G06K 9/64 (2006.01) *G06K 9/46* (2006.01)
- (21) International Application Number:
PCT/GB2008/001006
- (22) International Filing Date: 20 March 2008 (20.03.2008)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
0707192.1 13 April 2007 (13.04.2007) GB
- (71) Applicant (for GB, JP only): **MITSUBISHI ELECTRIC INFORMATION TECHNOLOGY CENTRE EUROPE BV** [NL/GB]; 20 Frederick Sanger Road, The Surrey Research Park, Guildford, Surrey GU2 7YD (GB).
- (71) Applicant (for all designated States except GB, JP, US): **MITSUBISHI ELECTRIC CORPORATION** [JP/JP]; 7-3, Marunouchi 2-chome, Chiyoda-ku, Tokyo 100-8310 (JP).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **SIBIRYAKOV, Alexander** [RU/GB]; Mitsubishi Electric Information Technology Centre Europe BV, 20 Frederick Sanger Road, The Surrey Research Park, Guildford, Surrey GU2 7YD (GB).
- (74) Agents: **PICKER, Madeline, Margaret** et al.; RGC JENKINS & CO., 26 Caxton Street, London SW1H 0RJ (GB).
- (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, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, 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, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

[Continued on next page]

(54) Title: GENERALIZED STATISTICAL TEMPLATE MATCHING UNDER GEOMETRIC TRANSFORMATIONS

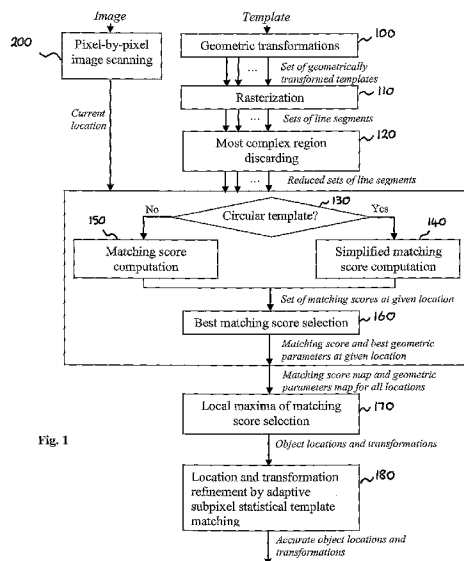


Fig. 1

(57) Abstract: A method of detecting a geometrically transformed object in an image comprises comparing a template comprising a plurality of line segments for the object with regions of an image, and determining a similarity measure that uses a statistical measure based on the sums of pixel values of line segments of the image corresponding to each of the line segments of the template. Embodiments of the invention use a discrete set of geometrically transformed versions of the template, for example using the similarity transform.

WO 2008/125799 A3



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:
19 March 2009

INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2008/001006

A. CLASSIFICATION OF SUBJECT MATTER
 INV. G06K9/64 G06K9/46

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)
 G06K

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)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/081360 A1 (LEE SHIH-JONG J [US] ET AL) 29 April 2004 (2004-04-29)	1-20; 23-25, 28,29
Y	paragraph [0025] - paragraph [0084]	27
X	EP 1 693 783 A (MITSUBISHI ELECTRIC INF TECH [GB]; MITSUBISHI ELECTRIC CORP [JP]) 23 August 2006 (2006-08-23) cited in the application	1,8
Y	paragraph [0027] - paragraph [0038]	21
Y	US 2006/029291 A1 (SUN ZHAOHUI [US] ET AL) 9 February 2006 (2006-02-09) paragraph [0044] - paragraph [0064]	21
X	US 6 546 137 B1 (LAI SHANG-HONG [US] ET AL) 8 April 2003 (2003-04-08)	26
Y	column 3, line 58 - column 5, line 52	27
	-/--	

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

15 January 2009

Date of mailing of the international search report

22/01/2009

Name and mailing address of the ISA/
 European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040,
 Fax: (+31-70) 340-3016

Authorized officer

Sonius, Michiel

INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2008/001006

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 330 353 B1 (LAI SHANG-HONG [US] ET AL) 11 December 2001 (2001-12-11) column 4, line 53 - column 6, line 57 -----	26

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2008/001006

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 allsearchable 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.:

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: 1-20,23,28,29

Statistical Template Matching

2. claims: 21,22,24-27

Determining transformations of objects

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2008/001006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004081360	A1	29-04-2004	NONE
EP 1693783	A	23-08-2006	CN 101147159 A 19-03-2008 WO 2006087580 A1 24-08-2006 JP 2008530700 T 07-08-2008 US 2008166016 A1 10-07-2008
US 2006029291	A1	09-02-2006	NONE
US 6546137	B1	08-04-2003	NONE
US 6330353	B1	11-12-2001	NONE