(19) World Intellectual Property Organization

International Bureau



(43) International Publication Date 29 April 2004 (29.04.2004)

PCT

(10) International Publication Number WO 2004/036500 A3

(51) International Patent Classification⁷: G06K 9/68

G06T 5/00,

(21) International Application Number:

PCT/IB2003/004142

(22) International Filing Date:

12 September 2003 (12.09.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

02079278.4

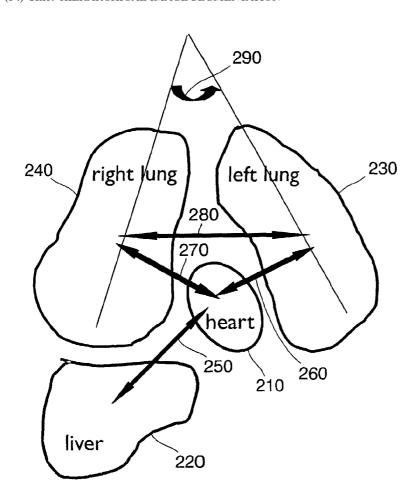
16 October 2002 (16.10.2002) EP

(71) Applicant (for all designated States except US): KONIN-KLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

- (72) Inventors; and
- (75) Inventors/Applicants (for US only): TRUYEN, Roel [BE/NL]; c/o Prof . Holstlaan 6, NL-5656 AA Eindhoven (NL). LOBREGT, Steven [NL/NL]; c/o Prof . Holstlaan 6, NL-5656 AA Eindhoven (NL). GERRITSEN, Frans, A. [NL/NL]; c/o Prof . Holstlaan 6, NL-5656 AA Eindhoven (NL).
- (74) Agent: SCHOUTEN, Marcus, M.; Philips Intellectual Property & Standards, Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: HIERARCHICAL IMAGE SEGMENTATION



(57) Abstract: An apparatus 1000 includes an input 1010 for receiving an N-dimensional signal, N≥2. storage 1030 stores a composite model of a composite structure for estimating parameters of the model with respect to the signal. The composite model is based on constituent models 210-290 that each correspond to a constituent structure in the signal and that are incorporated in the composite structure. Each constituent model is designated for estimating parameters of the constituent model with respect to the signal based on prior knowledge of the constituent structure. At least two of the constituent models are based on differing technologies. Each constituent model is provided with a uniform interface for controlling the constituent model and for retrieving parameters estimated by it. processor 1020 is programmed to estimate the model parameters by controlling the constituent models to estimate their parameters; retrieve estimated parameters from the constituent models; and to estimate parameters of the model in dependence on the retrieved parameters.



(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG,

ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Published:

- with international search report
- 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: 16 September 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

national Application No

	TO LEION OF OUR LEGE							
A. CLASSIFICATION OF SUBJECT MATTER IPC 7 G06T5/00 G06K9/68								
According to International Patent Classification (IPC) or to both national classification and IPC								
	SEARCHED	a aumhola)						
Minimum documentation searched (classification system followed by classification symbols) IPC 7 G06T G06K 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)								
EPO-Internal, WPI Data, INSPEC								
C. DOCUMENTS CONSIDERED TO BE RELEVANT								
Category °	Citation of document, with indication, where appropriate, of the rele	evant passages	Relevant to claim No.					
Category	Oligion of document, with indication, where appropriate, or the folia		Tione valle to claim voi					
Х	US 6 446 060 B1 (BERGMAN LAWERENC AL) 3 September 2002 (2002-09-03)	1-3, 5-12,14, 15,20,21						
	abstract column 5, line 23 - column 7, line 14 figures 2A,2B							
A	WO 01/37222 A (ANTHROPICS TECHNOL WILES CHARLES STEPHEN (GB); NEWMA AN) 25 May 2001 (2001-05-25) abstract page 16, line 1 - page 17, line 3 page 27, line 9 - page 28, line 4 figure 5	1–21						
Further documents are listed in the continuation of box C. X Patent family members are listed in annex.								
° Special categories of cited documents: "T" later document published after the international filing date								
'A' document defining the general state of the art which is not considered to be of particular relevance or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention invention or after the international state of the art which is not cited to understand the principle or theory underlying the invention or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention or priority date and not in conflict with the application but cited to understand the principle or the or priority date and not in conflict with the application but cited to understand the principle or the or priority date and not in conflict with the application but cited to understand the principle or the or priority date and not in conflict with the application but cited to understand the principle or the or priority date and not in conflict with the application but cited to understand the principle or the or priority date and not in conflict with the application but cited to understand the priority date and not in								
X document of particular relevance; the claimed invention filing date cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone								
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 document is combined with one or more other such document is combined with one or more other such document is combined with one or more other such document is combined with one or more other such document is combined with one or more other such document is combined with one or more other such document is combined with one or more other such document is combined with one or more other such document is combined with one or more other such document or more other such doc								
other "P" docum	means ant published prior to the international filing date but	ments, such combination being obvious to a person skilled in the art. & document member of the same patent family						
	actual completion of the international search	Date of mailing of the international search report						
1	4 July 2004	30/07/2004						
Name and mailing address of the ISA		Authorized officer						
	European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk							
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Kessler, C						

INTERNATIONAL SEARCH REPORT

Information on patent family members

national Application No

□ [/IB 03/04142]

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 6446060	B1	03-09-2002	NONE		
WO 0137222	A	25-05-2001	GB AU EP WO	2359971 A 1407001 A 1272979 A1 0137222 A1	05-09-2001 30-05-2001 08-01-2003 25-05-2001