

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
11 May 2006 (11.05.2006)

PCT

(10) International Publication Number
WO 2006/050102 A3

(51) International Patent Classification:
G06T 17/40 (2006.01)

(21) International Application Number:
PCT/US2005/038946

(22) International Filing Date: 27 October 2005 (27.10.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/623,057 28 October 2004 (28.10.2004) US
11/256,864 24 October 2005 (24.10.2005) US

(71) Applicant (for all designated States except US):
SIEMENS CORPORATE RESEARCH, INC. [US/US];
755 College Road East, Princeton, NJ 08540 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KIRALY, Atila Peter** [US/US]; 8806 Tamarron Drive, Plainsboro, NJ 08536 (US). **SHEN, Hong** [CN/US]; 7 Titus Ln., Plainsboro, NJ 08540 (US).

(74) Agents: **PASCHBURG, Donald B.** et al.; Siemens Corporation- Intellectual Property Dept., 170 Wood Avenue South, Iselin, NJ 08830 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, 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, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, 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, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

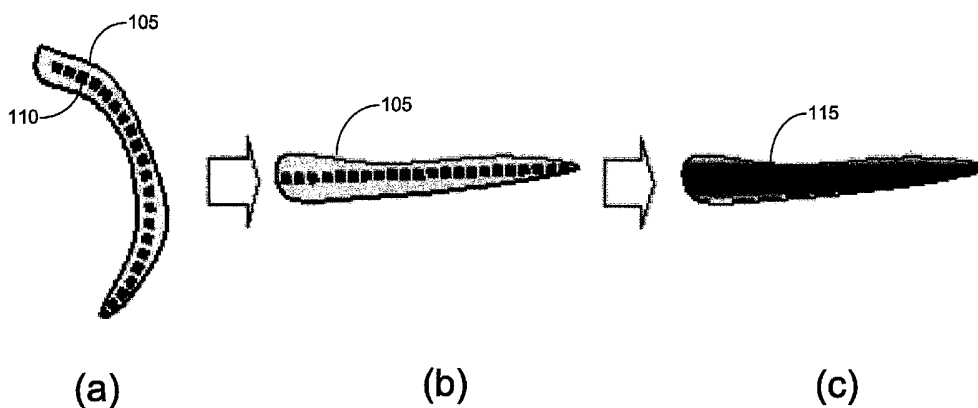
Published:

— with international search report

(88) Date of publication of the international search report:
24 August 2006

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.

(54) Title: 2D VISUALIZATION FOR RIB ANALYSIS



(57) Abstract: An exemplary method of visualization is provided. A centerline is computed (at 310) for each of a plurality of ribs in a three-dimensional (3D) image. The each of the plurality of ribs is straightened (at 320) based on the centerline computation. A two-dimensional (2D) image is generated (at 330) based on the straightened ribs.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2005/038946

A. CLASSIFICATION OF SUBJECT MATTER

G06T17/40

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)

G06T

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, INSPEC, 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	ZHAN ZHANG ET AL: "A prototype colon straightening system for polyp detection" PROC. 17TH IEEE SYMPOSIUM ON COMPUTER-BASED MEDICAL SYSTEMS, CA, USA, 2004, pages 548-552, XP010708019 ISBN: 0-7695-2104-5	1-3,11
Y	page 548, last paragraph - page 549, paragraph 2 page 550, paragraph 1 ----- -/--	4-10

☒ 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 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

9 March 2006

Date of mailing of the international search report

24/04/2006

Name and mailing address of the ISA/

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

Authorized officer

Pierfederici, A

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2005/038946

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	HONG SHEN ET AL: "Tracing based segmentation for the labeling of individual rib structures in chest CT volume data" MEDICAL IMAGE COMPUTING AND COMPUTER-ASSISTED INTERVENTION - MICCAI 2004. 7TH INT. CONF. (LECTURE NOTES IN COMPUT. SCI. VOL.3217) SPRINGER-VERLAG BERLIN, GERMANY, vol. 2, 2004, pages 967-974 Vol.2, XP009061289 cited in the application page 970, paragraph 3 - page 971, paragraph 7	4-10
A	GREVERA G J ET AL: "GMIP: generalized maximum intensity projection" PROCEEDINGS OF THE SPIE - THE INTERNATIONAL SOCIETY FOR OPTICAL ENGINEERING SPIE-INT. SOC. OPT. ENG USA, vol. 5367, no. 1, 25 May 2004 (2004-05-25), pages 636-645, XP008110879 ISSN: 0277-786X page 636, last paragraph - page 638, paragraph 2	8,9
A	ZHANG Z ET AL: "Colon straightening based on elastic mechanics model" 2004 2ND IEEE INTERNATIONAL SYMPOSIUM ON BIOMEDICAL IMAGING: MACRO TO NANO IEEE PISCATAWAY, NJ, USA, vol. 1, 2004, pages 292-295 Vol., XP010773855 ISBN: 0-7803-8388-5 page 292, right-hand column, paragraph 1 - paragraph 2	1-11
A	SILVER D ET AL: "RESHAPING MEDICAL VOLUMETRIC DATA FOR ENHANCED VISUALIZATION" MEDICINE MEETS VIRTUAL REALITY CONFERENCE, vol. 2/10, 23 January 2002 (2002-01-23), pages 488-493, XP009061681 abstract; figures 1,2 page 489, paragraph 3 - page 490, last paragraph	1-11
A	US 2002/168110 A1 (AL-KOFAHI KHALID ET AL) 14 November 2002 (2002-11-14)	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2005/038946

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002168110 A1	14-11-2002	NONE	