(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 030 187 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
14.05.2003 Bulletin 2003/20

(43) Date of publication A2:
23.08.2000 Bulletin 2000/34

(21) Application number: **00301299.4**

(22) Date of filing: **18.02.2000**

(51) Int Cl.[7]: **G01S 7/52**, G01S 15/89, G06T 11/00, A61B 8/00, G06T 5/00

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **19.02.1999 US 253384**

(71) Applicant: **The John P. Robarts Research Institute**
London, Ontario N6A 5K8 (CA)

(72) Inventors:
- **Zahalka, Abir**
  Jerusalem 91676 (IL)
- **Fenster, Aaron**
  London, Ontario N6G 4N9 (CA)

(74) Representative: **Roberts, Gwilym Vaughan et al**
KILBURN & STRODE,
20 Red Lion Street
London WC1R 4PJ (GB)

(54) Automated segmentation method for 3-dimensional ultrasound

(57) An ultrasound segmentation method comprising the steps of automated initial contour identification, followed by application of a geometrically deformable model (GDM). The formation of the initial contours involves the input of a single seed point by the user, and has been found to be insensitive to the placement of the seed within a structure. The GDM minimizes contour energy, providing a smoothed final result, with only three simple parameters being required as easily selectable input values.

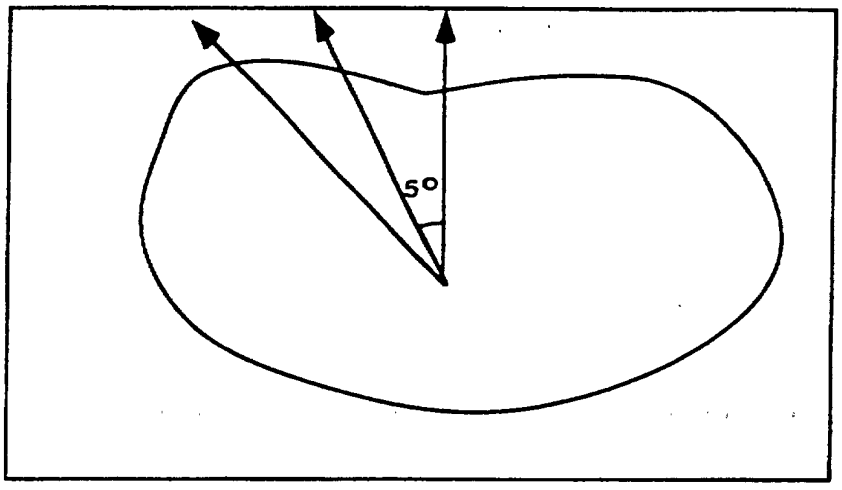

Fig. 2

EP 1 030 187 A3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 30 1299

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	STALIDIS G ET AL: "Detection and modeling of infarcted myocardium regions in MRI images using a contour deformable model" COMPUTERS IN CARDIOLOGY 1995 VIENNA, AUSTRIA 10-13 SEPT. 1995, NEW YORK, NY, USA,IEEE, US, 10 September 1995 (1995-09-10), pages 17-20, XP010154347 ISBN: 0-7803-3053-6 * abstract * * page 18, right-hand column - page 19, right-hand column * ---	1	G01S7/52 G01S15/89 G06T11/00 A61B8/00 G06T5/00
D,A	S. LOBREGT, M.A. VIERGEVER: "A Discrete Dynamic Contour Model" IEEE TRANS. ON MED. IMAGING, vol. 14, no. 1, 1 March 1995 (1995-03-01), pages 12-24, XP002234607 * the whole document * ---	1-11	
A	US 5 457 754 A (HAN CHIA Y ET AL) 10 October 1995 (1995-10-10) * abstract; figures 8-14,19,23,29 * * column 2, line 4-63 * * column 7, line 5 - column 8, line 6 * * column 10, line 15 - column 12, line 50 * ---	1-11	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G06T G01S
A	US 4 961 425 A (KENNEDY DAVID N ET AL) 9 October 1990 (1990-10-09) * column 2, line 3-34 * --- -/--	1-11	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	17 March 2003	Reuss, T

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 30 1299

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	A. GOSHTASBY, D.A. TURNER: "Segmentation of Cardiac Cine MR Images for Extraction of Right and Left Ventricular Chambers" IEEE TRANS. ON MEDICAL IMAGING, vol. 14, no. 1, 1 March 1995 (1995-03-01), pages 56-64, XP002234608 * the whole document *	1-11	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	17 March 2003	Reuss, T

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 30 1299

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-03-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5457754 A	10-10-1995	NONE	
US 4961425 A	09-10-1990	US 5185809 A	09-02-1993

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	用于三维超声的自动分割方法		
公开(公告)号	EP1030187A3	公开(公告)日	2003-05-14
申请号	EP2000301299	申请日	2000-02-18
申请(专利权)人(译)	约翰P.罗巴茨研究所		
当前申请(专利权)人(译)	约翰P.罗巴茨研究所		
[标]发明人	ZAHALKA ABIR FENSTER AARON		
发明人	ZAHALKA, ABIR FENSTER, AARON		
IPC分类号	A61B8/00 G06T5/00 G01S7/52 G01S15/89 G06T11/00		
CPC分类号	G06T7/0012 G06T7/12 G06T7/149 G06T2207/10136 G06T2207/20101 G06T2207/20168 G06T2207/30101 Y10S128/922		
优先权	09/253384 1999-02-19 US		
其他公开文献	EP1030187A2		
外部链接	Espacenet		

摘要(译)

一种超声分割方法，包括自动初始轮廓识别，然后应用几何可变形模型（GDM）的步骤。初始轮廓的形成涉及用户输入单个种子点，并且已经发现对种子在结构内的放置不敏感。 GDM最大限度地减少了轮廓能量，提供了平滑的最终结果，只需要三个简单的参数作为易于选择的输入值。

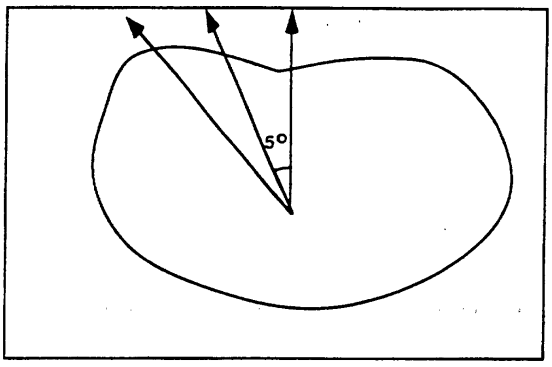

Fig. 2