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(71) Applicants:
- **MEDISON CO., LTD.**
  **Nam-myun**
  **Hongchun-gun**
  **Kangwon do 250-870 (KR)**
- **Korea Advanced Institute of Science and Technology**
  **Daejeon 305-338 (KR)**

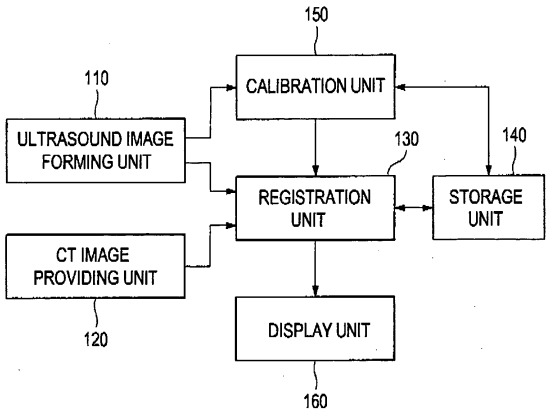
(72) Inventors:
- **Hyun, Dong Gyu**
  **Seoul 135-851 (KR)**
- **Ra, Jong Beom**
  **Daejeon 30-762 (KR)**
- **Lee, Duhgoon**
  **Daejeon 302-170 (KR)**
- **Nam, Woo Hyun**
  **Busan 616-806 (KR)**
- **Kang, Dong-Goo**
  **Suwon-si, yeonggi-do 441-400 (KR)**

(74) Representative: **Schmid, Wolfgang**
**Lorenz & Kollegen**
**Patentanwälte Partnerschaftsgesellschaft**
**Alte Ulmer Strasse 2**
**89522 Heidenheim (DE)**

## (54) Registration of CT image onto ultrasound images

(57) Embodiments for registering a CT image onto ultrasound images are disclosed. At a preoperative stage, a plurality of first ultrasound images are formed during a respiratory cycle and a CT image is obtained at the maximum inspiration. The CT image is registered onto each of the ultrasound images to thereby form ultrasound-CT registered images. The ultrasound-CT registered images may be stored in the storage unit. Subsequently, at an intraoperative stage, a plurality of second ultrasound images may be sequentially formed in real time. Similarities may be measured between the first ultrasound images and the second ultrasound images, and the ultrasound-CT registered images, each corresponding to each of the first ultrasound images having highest similarity to the second ultrasound image may be retrieved. The retrieved ultrasound image and the second ultrasound image may be displayed at the same time.

FIG. 1

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# EUROPEAN SEARCH REPORT

Application Number
EP 09 00 7286

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
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| A | XISHI HUANG ET AL: "Dynamic 3D Ultrasound and MR Image Registration of the Beating Heart", 1 January 2005 (2005-01-01), MEDICAL IMAGE COMPUTING AND COMPUTER-ASSISTED INTERVENTION - MIC CAI 2005 LECTURE NOTES IN COMPUTER SCIENCE;;LNCS, SPRINGER, BERLIN, DE, PAGE(S) 171 - 178, XP019021752, ISBN: 978-3-540-29326-2 * abstract * * section 2 * ----- -/-- | 1-15 | TECHNICAL FIELDS SEARCHED (IPC) G06T |

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 24 October 2011 | Eveno, Nicolas |

CATEGORY OF CITED DOCUMENTS

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| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
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| A | BLACKALL J M ET AL: "ALIGNMENT OF SPARSE FREEHAND 3-D ULTRASOUND WITH PREOPERATIVE IMAGES OF THE LIVER USING MODELS OF RESPIRATORY MOTION AND DEFORMATION", IEEE TRANSACTIONS ON MEDICAL IMAGING, IEEE SERVICE CENTER, PISCATAWAY, NJ, US, vol. 24, no. 11, 1 November 2005 (2005-11-01), pages 1405-1416, XP001240918, ISSN: 0278-0062, DOI: 10.1109/TMI.2005.856751 * abstract * * section II * * figures 1,2 * ----- | 1-15 | |
| A | LINDSETH FRANK ET AL: "Multimodal image fusion in ultrasound-based neuronavigation: improving overview and interpretation by integrating preoperative MRI with intraoperative 3D ultrasound", COMPUTER AIDED SURGERY, TAYLOR & FRANCIS INC., PHILADELPHIA, PA, US, vol. 8, no. 2, 1 January 2003 (2003-01-01) , pages 49-69, XP002481510, ISSN: 1092-9088, DOI: 10.3109/10929080309146040 * the whole document * ----- | 1-15 | TECHNICAL FIELDS SEARCHED (IPC) |

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& : member of the same patent family, corresponding document

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| | | | |
|---|---|---|---|
| 专利名称(译) | 将CT图像配准到超声图像上 | | |
| 公开(公告)号 | EP2131326A3 | 公开(公告)日 | 2011-12-07 |
| 申请号 | EP2009007286 | 申请日 | 2009-06-02 |
| [标]申请(专利权)人(译) | 韩国科学技术院 | | |
| 申请(专利权)人(译) | MEDISON CO.，LTD.<br>韩国高等学院科技 | | |
| 当前申请(专利权)人(译) | 韩国高等学院科技<br>三星MEDISON CO.，LTD. | | |
| [标]发明人 | HYUN DONG GYU<br>RA JONG BEOM<br>LEE DUHGOON<br>NAM WOO HYUN<br>KANG DONG GOO | | |
| 发明人 | HYUN, DONG GYU<br>RA, JONG BEOM<br>LEE, DUHGOON<br>NAM, WOO HYUN<br>KANG, DONG-GOO | | |
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| CPC分类号 | A61B6/032 A61B6/5247 A61B6/541 A61B8/00 A61B8/5238 G06T7/33 G06T7/38 G06T2207/10081 G06T2207/10132 G06T2207/30004 | | |
| 代理机构(译) | SCHMID，WOLFGANG | | |
| 优先权 | 1020080052652 2008-06-04 KR | | |
| 其他公开文献 | EP2131326A2<br>EP2131326B1 | | |
| 外部链接 | Espacenet | | |


摘要(译)

公开了用于将CT图像配准到超声图像上的实施例。在术前阶段，在呼吸循环期间形成多个第一超声图像，并且在最大吸气时获得CT图像。将CT图像配准到每个超声图像上，从而形成超声CT注册图像。超声CT扫描图像可以存储在存储单元中。随后，在术中阶段，可以实时顺序地形成多个第二超声图像。可以在第一超声图像和第二超声图像之间测量相似度，并且可以检索每个对应于与第二超声图像具有最高相似度的每个第一超声图像的超声CT记录图像。可以同时显示检索到的超声图像和第二超声图像。


FIG. 1