Wrists in space: deformable models for segmentation and matching techniques for registration of 3-D MR and CT images of the wrist
Snel, J.G.

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WRISTS IN SPACE

DEFORMABLE MODELS FOR SEGMENTATION
AND MATCHING TECHNIQUES FOR
REGISTRATION OF
3-D MR AND CT IMAGES
OF THE WRIST

JEROEN G. SNEI
About this thesis

Advanced medical imaging techniques such as magnetic resonance imaging (MRI) or computed tomography (CT), provide exceptional views of the internal anatomy of the human body. However, the ability to quantify and analyze the embedded anatomical structures with any accuracy is limited.

Both in the areas of diagnostic radiology and wrist surgery there is a growing interest in quantitative methods for radiological diagnosis of wrist pathologies. These interests resulted into a Ph.D. project in the Academic Medical Center (AMC) at the University of Amsterdam. This thesis describes the image processing techniques that were developed as a part of this project to analyze three-dimensional (3-D) MR and CT images of wrists.

Contour tracing and surface extraction algorithms were designed to reconstruct the 3-D geometry of the wrist joint. For a kinematic joint analysis a 3-D image registration technique was developed that traces the relative movements of the different bones of the wrist. The analysis can provide valuable information on the long term results of operative interventions and possibly predict results of new techniques in the fast evolving field of wrist surgery.

Jeroen Snel (1968) studied applied physics (1988-1994) at the University of Amsterdam. In May 1994 he started his Ph.D. work in the Medical Technology group headed by professor C.A. Grimbergen at the department of Medical Physics of the AMC, Amsterdam. His research interests include geometric modeling, image processing, and visualization.

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Deformable Models for Segmentation and Matching Techniques for Registration of 3-D MR and CT Images of the Wrist

ACADEMISCH PROEFSCHRIFT

TER VERKRIJGING VAN DE GRAAD VAN DOCTOR AAN DE UNIVERSITEIT VAN AMSTERDAM OP GEZAG VAN DE RECTOR MAGNIFICUS PROF. DR J.J.M. FRANSE TEN OVERSTAAN VAN EEN DOOR HET COLLEGE VOOR PROMOTIES INGESTELDE COMMISSIE, IN HET OPENBAAR TE VERDEDIGEN IN DE AULA DER UNIVERSITEIT

OP

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Prof. dr J. Strackee
Prof. dr ir M.A. Viergever
In herinnering aan Michaël en Boom
This thesis is based on the following articles:


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*Institute of Electrical and Electronics Engineers*
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