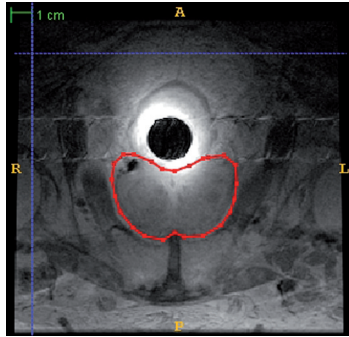


With an estimated annual incidence of 250,000 cases per year, prostate cancer is the most common cancer in men in North America. By recent projections from the American and Canadian Cancer Societies, within the next ten years there would be about 450,000 new cases of prostate cancer diagnosed each year, doubling the current incidence. The potential societal impact of developing sensitive prostate biopsy and effective image-guided prostate cancer therapy methods cannot be overestimated. MRI is an attractive choice for image-guided prostate cancer interventions, primarily due to its high sensitivity for detecting suspicious nodules, high spatial resolution, excellent soft tissue contrast, and multiplanar volumetric imaging capabilities. In order to construct and execute precise intervention plans, prostate and adjacent structures often need to be segmented in MRI.



The use of different patient positions, different endorectal coils and different imaging sequences during planning and intervention make segmentation extremely difficult. In all, accurate, robust and automated segmentation of the prostate and adjacent structure is a key enabler for MRI-guided prostate cancer interventions.

3D SEGMENTATION CHALLENGE FOR CLINICAL APPLICATIONS

CONTINUATION OF MICCAI 07 AND MICCAI 08 WORKSHOPS

This workshop is a continuation of the successful MICCAI 2007 and MICCAI 2008 workshops “3D Segmentation in the clinic: a grand challenge”. We will use a very similar format adapted to the new set of clinical applications in this year’s challenge. The primary goal of this workshop is to quantitatively evaluate the performance of 3D image segmentation algorithms for four clinical applications, namely carotid artery, prostate, left ventricle and mandible and brain stem segmentation. The competition will be conducted using a set of clinical image databases that cover a wider range of patients, pathologies, as well as image sources. We will develop dedicated comprehensive evaluation tools to target each individual application for an objective assessment of the algorithm performance. Three sets of test images will be provided to all participants. The first set includes expert, ground truth manual annotations and is used for fine-tuning the algorithms. The second set will be used to evaluate the methods before the workshop and provide results for the workshop papers. The third set will be used at the workshop to evaluate all submitted algorithms on-site.

Submissions of the same algorithm already submitted to the main conference (or other workshops) are allowed, as well as submission of already published methodologies – the focus of this workshop is segmentation accuracy and stability under real-world conditions. The authors will be provided with the evaluation of their method on the second, abovementioned dataset in order to complete the result section of their workshop paper.

The second major goal of the workshop is to foster in-depth discussions and technical interchange among researchers. For this reason, the workshop consists of a combination of in-depth presentations of selected algorithm, poster, and discussion sessions.

Organisers:

Theo van Walsum	Leo Joskowicz
Maria A. Zuluaga	Nobuhiko Hata
Gabor Fichtinger	Vladimir Pekar
Perry Radau	

Website:

<http://grand-challenge2009.bigr.nl>

wiki.na-mic.org/Wiki/index.php/2009_Prostate_segmentation_challenge_MICCAI



3D SEGMENTATION IN THE CLINIC A GRAND CHALLENGE

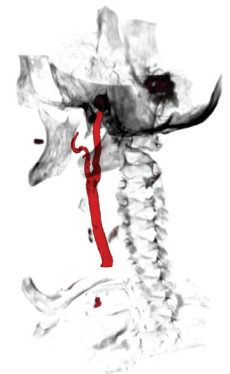
CAROTID BIFURCATION LUMEN SEGMENTATION AND STENOSIS GRADING

PROSTATE SEGMENTATION

HEAD AND NECK SEGMENTATION

CARDIAC MR LEFT VENTRICLE SEGMENTATION

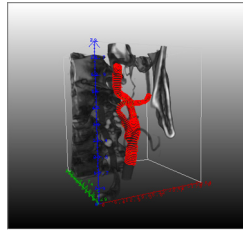
Training and test data available
Standardized evaluation measures



MICCAI 2009, LONDON
24 September 2009

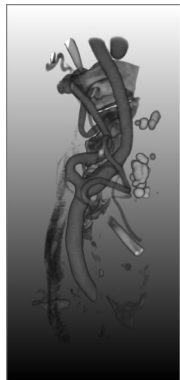


The goal of this challenge is to compare CTA carotid bifurcation lumen segmentation and stenosis grading algorithms. Developers of generic methods for extracting tubular structures from 3D images, or whose application has been developed for other imaging modalities or anatomies, are also very welcome to join this competition and tailor their methods to these specific applications.



Two types of algorithms will be evaluated: fully automated approaches that do not require user interaction, and algorithms that use three positions at maximum as input: a point in the common carotid artery, a point in the external carotid artery, and a point in the internal carotid artery.

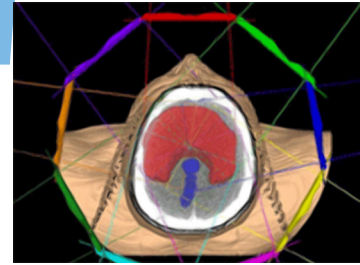
The carotid CTA data for this challenge was acquired in three different centers: the Erasmus MC in Rotterdam, The Netherlands, the Hadassah University Hospital in Jerusalem, Israel and Hôpital Louis Pradel in Bron, France, and on different scanners from Siemens and Philips. The complete set consists of 56 CTA datasets, representing a wide variety of clinical datasets. Three trained observers have annotated the lumen contours around the bifurcation, and have performed stenosis measurements using the segmented lumen of the internal carotid artery.



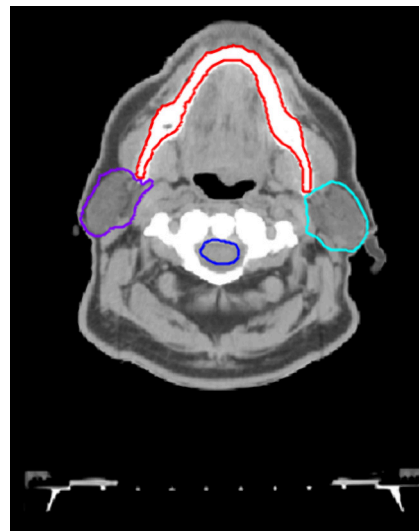
Fifteen of these datasets will be available for training, ten datasets will be used for on-site testing during the workshop and the rest of the datasets will be used for testing through online submissions, prior to the workshop.

The goal of this challenge is to compare fully automatic methods for segmenting anatomical structures in head and neck CT data used in radiotherapy planning. One bony structure (mandible) and one soft tissue structure (brainstem) will be offered for the competition. They both represent important organs at risk, which need to be accurately delineated in preparation for radiation treatment.

The evaluation of the segmentation accuracy will be done by slice-by-slice comparison with manual delineations using dedicated validation methodology, one specific criterion being the assessment of the amount of the required manual corrections.

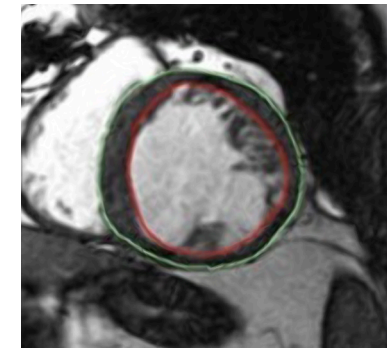
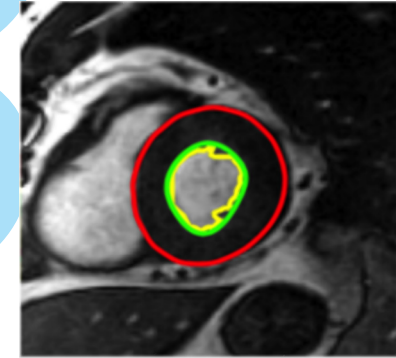


The data for this challenge is provided by Princess Margaret Hospital, Toronto. It consists of 25 CT datasets with the typical resolution of 1x1x2 mm and represents a wide variety of patient body types. Ground truth segmentations have been created by a clinical expert using standard manual delineation tools.



Ten datasets are available for training, eight datasets will be used for testing and the last seven datasets will be used for the competition during the workshop.

In the Cardiac MR Left Ventricle Segmentation Challenge, participants enter their best software algorithm to find LV contours automatically, with little or no user intervention. The goal of this contest is to compare state-of-the-art LV segmentation methods by providing an evaluation system and a database of cardiac cine MR images and expert contours freely available on the internet for research purposes. The database will contain 45 cine-MRI images from a range of patients and pathology, together with the manual segmentations determined by an experienced cardiologist on the end-diastolic (ED) and end-systolic (ES) phases. The evaluations and data will be provided by the Imaging Research Department, Sunnybrook Health Sciences Centre, Toronto, Canada.



The database will contain 45 cine-MRI images from a range of patients and pathology, together with the manual segmentations determined by an experienced cardiologist on the end-diastolic (ED) and end-systolic (ES) phases. The evaluations and data will be provided by the Imaging Research Department, Sunnybrook Health Sciences Centre, Toronto, Canada.