visceral

Identification, Localisation, and Segmentation Benchmark

Call for participation

While a growing number of benchmark studies compare the performance of algorithms for automated organ segmentation or lesion detection in images with restricted field of views, no efforts have been made so far towards benchmarking these and related routines for the automated **identification and segmentation of bones, inner organs and relevant substructures** visible in an image volume of the abdomen, the trunk or even the whole body.

In order to gauge the current state-of-the-art in automated whole-body image annotation and compare different methodological approaches, we are organizing the "VISCERAL Identification, Localisation and Segmentation Benchmark". For this purpose, **we are making available a large dataset of clinical whole-body MRI and CT scans in which major organs and their substructure have been manually delineated, as well as specific anatomical interest points.**

To deal with the large amount of data that are to be processed, we will provide **data and computing resources via a decentralized ("cloud") architecture** that will provide participants with access both to several hundreds of image volumes and computing resources that will be used for training algorithms and for applying them to the test data.

Whole-body image processing

The automated annotation of all anatomical structures in a given image volume provides means, for example, to:

⇒ initialize semi-automated algorithms for anatomical annotation, for example, in radiation therapy planning

⇒ initialize dedicated algorithms analysing specific diseases and pathologies in a second level

⇒ improve the presentation of image information to human interpreter, as well as order and prioritize image information for archiving

⇒ transform unstructured image data into structured information, e.g., for image retrieval to access archived information in clinical diagnostics

⇒ quantify anatomical structures in vivo from a large collection of clinical images for the first time, and provide technology to do this in the future also for patient populations with diseases that may affect macroscopic anatomy patterns

Moreover, it will allow testing the generalization properties of medical image processing routines and allow identifying general concepts that perform well in a multitude of situations.
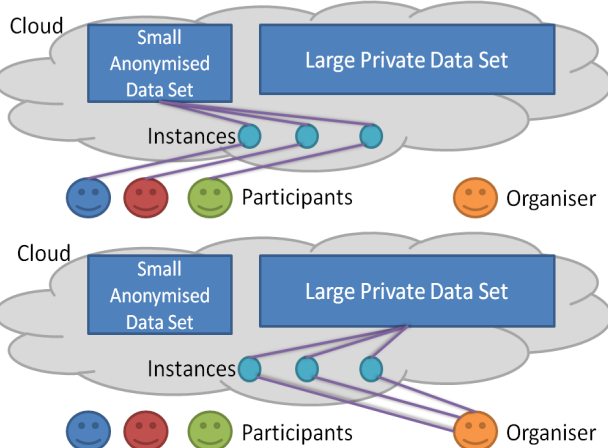
How the benchmark challenge will be organized

The "VISCERAL Identification, Localization and Segmentation Benchmark" addresses researchers in fields such as **medical image processing, computer vision, machine learning, image and information retrieval.** Routines employed by the participants can process all or few selected anatomical structures or interest points, but must be able to perform their analysis without human interaction on test data similar to the training image.

It will take place from **1 August 2013 to 30 November 2013.** Within this time window participants can set up, optimize, and train their segmentation, detection, or annotation routines. After November 2013 the routines will be applied to the test data and results will be released (see below).

For further information see **www.visceral.eu** also providing updates and contact details. We kindly ask possible participants to contact any of the organizers as early as possible.

Training phase: The participants each have their own computing instance in the cloud (provided by VISCERAL), linked to a small dataset of the same structure as the large one. Software for carrying out the benchmark objectives is placed into the instances by the participants. The large data set is kept separate.

Testing phase: On the benchmark submission deadline, the organizer takes over the instances from the participants, links them to the large data set, executes the software on the large dataset and evaluates the results.

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