ASMTB: AN EXTENSIBLE DEVELOPMENT ENVIRONMENT FOR 3D SEGMENTATIONS BASED ON ACTIVE SHAPE MODELS

Florian Bernard¹,²,³, Peter Gemmar³, Andreas Husch¹,²,³, Frank Hertel¹

¹ Centre Hospitalier de Luxembourg, Luxembourg City, LUXEMBOURG
² Luxembourg Centre for Systems Biomedicine, University of Luxembourg, Esch-sur-Alzette, LUXEMBOURG
³ Trier University of Applied Sciences, Trier, GERMANY

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Background
Segmentation approaches based on statistical shape models (SSM), such as the Active Shape Model (ASM) framework, are a family of powerful methods for image segmentation [1]. However, deploying SSMS for practical image segmentation tasks is non-trivial, as a vast amount of configurations of the algorithm has to be chosen, each having a substantial impact on segmentation quality.

Aims
The objective is to simplify the application and evaluation of ASMs for tackling individual segmentation tasks and to provide an extensible framework including a graphical user interface (GUI) for the efficient exploration of various parametrisations and alterations (e.g. as described in [1,2]) of the ASM method.

Methods
A prototype of a development environment (DE) for the application of ASM-based segmentation methods has been developed in MATLAB.

As a particular segmentation task has its individual requirements and peculiarities it is not possible to provide a general framework that is suitable to all thinkable scenarios. Thus, our focus is on providing a robust object-oriented (OO) software architecture that can easily be tailored to specific tasks.

A class diagram of the core structure is shown in Figure (a).

On top of this OO framework a GUI has been developed in order to enable the interaction with the core components.

The GUI comprises the following four modules:
1. Training module (Figure (b))
2. ASM Inspection module (Figure (c))
3. Search module (Figure (d))
4. Evaluation module

Results
The developed software is currently used for applying ASMs for the 3D segmentation of deep brain structures [3] and has proven to be a highly valuable tool for evaluating various ASM configurations.

Conclusions
In order to simplify the application of SSMS for practical segmentation tasks by improving the efficiency of the exploration of various configurations and parametrisations, a prototype DE for ASM-based segmentation has been developed.

References