

43075-01 Probabilistic Shape Modelling

Project 2

Introduction 23.04.
Deadline **28.05, 13:59**

Introduction

The goal in this project is to perform a model-based segmentation of 5 CT femur images using MCMC methods and Active Shape Models.

Software and project data

You can download a zip file with the data from

<http://shapemodelling.cs.unibas.ch/project/femur-data.zip>

The zip file contains the following datasets:

- Active Shape Model of the femur learned from 25 registered femurs and CT images
- Test dataset of 5 femur CT images with a corresponding segmented mesh (that is in correspondence with the model)
- A dataset of 5 femur CT images to be segmented.

Project Task

Work through the tutorials on Active Shape Models and MCMC (Tutorials 13-15) on <https://unibas-gravis.github.io/scalismo-tutorial/>.¹

Use the methods and techniques that you find in these tutorials as a starting point to put together a segmentation algorithm. You are free to use whatever other tools you learned in this course to solve this projects, such as for example manually clicked landmarks, Procrustes Analysis, GP Posteriors, etc).

This project is organized as a challenge. We have for each image corresponding ground truth segmentations, which we will compare with your segmentation. Given that this challenge is not hosted on SMIR, we will perform this evaluation *only once* (after you submitted the deliverables). In order to assess the quality of your segmentation method you should therefore make use of the provided test datasets.

Project deliverable

- 5 segmented femur meshes that are in correspondence with the provided ASM model
- A short report (2 to 3 pages) detailing the method you used to perform the segmentation
- The Scala source code of your solution

Please upload your reconstructions, the report and your source code, as a zip archive using courses.

¹Please note that these tutorials do not work in ScalismoLab. If you want to use ScalismoLab instead of the latest Scalismo version, please send us an e-mail. We will then give you detailed instructions on how to work on this project using ScalismoLab.

