University of Basel
of Basel

Department of
Biomedical Engineering

BAMM
Basel Muscle MRI

Master of Science – Biomedical Engineering

Thesis Proposal

### Segment By Example: a deep-learning approach to generic atlas-based segmentation

Medical image segmentation is an important step for the extraction of quantitative values from medical images. From simple calculation of areas and volumes of organs and lesions, to calculating complex statistics and radiomics features, accurate separation and labeling of anatomical structures is a fundamental, although time-consuming and rather boring, task.

New image   Result

In recent years, deep learning methods have been developed to tackle this problem. However, generally speaking, a new model has to be trained on specific data to solve each particular problem.

In this project, the candidate will implement a deep learning method that can solve generic segmentation

Example segmented image

problems, by giving the model an example image with the desired anatomy segmented as input, together with an unsegmented image representing a similar anatomy and contrast, in a different subject.

The method should learn to transfer the information from the example image onto the new image.

Publicly available datasets will be used as training data. The code will be released as open source.
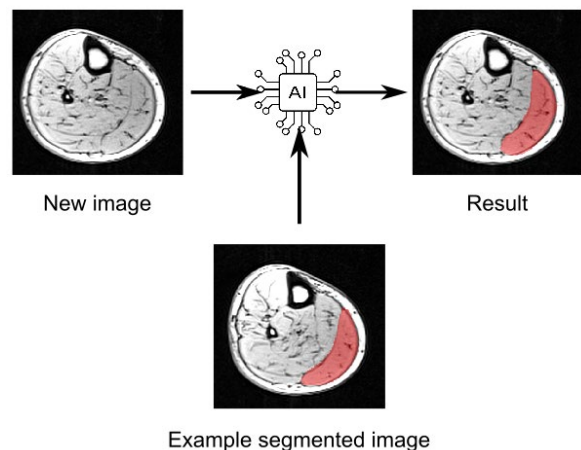
Nature of the Thesis
Literature/dataset search: 10%
Programming: 70%
Documentation: 20%

Specific Requirements
Good knowledge of Python.
Basic knowledge of neural network architectures.

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