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# Boundary Detection in Lung CT Images

| Art | Masterarbeit |
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| Arbeitstitel | Machine Learning-based Boundary Detection of multi-tissue Lung CT images |

To quantitatively assess parameters from lung CT images such as lung volume, weight, and gas content, a precise delineation of the lung boundary is necessary in each image slice. Common complications for this task are effusions (blood or other fluids), pneumothorax (trapped air), atelectasis (collapsed lung regions) and injuries such as broken ribs. These complications have slightly different grayscale distributions, but their accurate separation is challenging even for a knowledgeable user.

In this project, a statistical model for each type of complication shall be developed, including grayscale distribution and position information, for example relative to invariant anatomical landmarks such as the spine. Using machine learning and training data from a large data base of segmented CT images, the algorithm shall be capable of separating the different tissue types reliably. One possible use case for this method comprises the user clicking into a region of interest; the algorithm then determines which tissue type the region consists of and applies a Region Growing-like method to expand the segmentation from the clicked location to the tissue boundaries.

The algorithm will be implemented into the MITK framework. Integration into an iPad App using the Apple Pencil is optional.

## Anforderungen

- Experience with image processing
- Experience with machine learning, preferably in the field of image processing
- Matlab and/or C++
- Swift is helpful, but not required

## Kontakt

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