Deep learning for automatic segmentation of tumors on MRI
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DEEP LEARNING FOR AUTOMATIC SEGMENTATION OF TUMORS ON MRI

1. Combining different MRI sequences as input channels for segmentation networks improves the segmentation performance compared to the use of single sequences (This thesis, Chapter 2).

2. Reducing the amount of context given to a segmentation network leads to more accurate auto-segmentations compared to providing the whole image as input (This thesis, Chapters 2 and 3).

3. Current auto-segmentation frameworks render segmentations that are comparable to clinically acceptable segmentations for challenging tasks, such as the automatic segmentation of the cervical cancer on the MRI images acquired for brachytherapy treatment (This thesis, Chapter 4).

4. Simple quality metrics for the tumor auto-segmentations can be directly derived from the softmax activations of segmentation networks, making them highly valuable for quality assurance (This thesis, Chapter 5).

5. Studies on automatic medical image segmentation should not rely solely on the Dice Similarity Coefficient (DSC) for evaluation but rather apply a combination of various metrics, especially distance based-metrics, to provide a more comprehensive and clinically relevant assessment of the auto-segmentations.

6. Loss functions that take into account radiotherapy specific endpoints, such as dosimetric impact metrics*, will render more clinically relevant auto-segmentations than the conventional geometric-based loss functions.
   *Rüfenacht et al. 2023. MICCAI

7. Current efforts in the field of auto-segmentation should focus on the clinical implementation of auto-segmentation techniques, rather than in pursuing minimal performance increments.

8. Assessing the variability of auto-segmentation networks between different training runs with the same hyperparameter configuration should be standard practice to prevent over- or underestimation of the network's performance.

9. When performing research in the field of computer vision, qualitatively inspecting the investigated images is as important as analyzing the quantitative results.

10. Due to the association between an enhanced social support system and better mental* and physical health**, enjoying a drink or a nice meal with friends or family are not only fun plans but excellent examples of integrative medicine interventions.
    * Choi et al. 2023 Nature Mental Health
    ** Datta et al. 2023 The American Journal of Cardiology