Deep learning for automated analysis of cardiac imaging: applications in Cine and 4D flow MRI
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Stellingen behorend bij het proefschrift getiteld

Deep Learning for Automated Analysis of Cardiac Imaging: Applications in Cine and 4D Flow MRI

1. A deep learning model employing late fusion and trained on resliced short-axis view data provides the best performance for left ventricular segmentation in 4D flow MRI. - This thesis (Chapter 5)

2. The performance of the proposed 4D flow segmentation deep learning model will improve when using carefully designed data augmentation methods for the velocity images. - This thesis (Chapter 6)

3. Using a deep learning-based algorithm, intra-cardiac blood flow velocities can be predicted from long-axis cine MRI with high correlation with 4D flow derived velocities. - This thesis (Chapter 7)

4. It is important to be aware that the final evaluation measurements should be valuable and reliable for the quantitative assessment of a model's performance. - This thesis (Chapter 8)

5. Quantitative phenotypes derived from cardiovascular magnetic resonance (CMR) images enable us to assess cardiac and aortic structure and function in a non-invasive way, and provide important biomarkers for the determination of pathological states in CVDs. - *Nat Med 26, 1654–1662 (2020)*

6. Despite the recent success of deep learning-based segmentation methods, their applicability to specific image analysis problems of end-users is often limited. - *Nat Methods 18, 203–211 (2021).*

7. 4D flow MRI can be performed as part of a standard-of-care cardiothoracic MRI protocol, and data analysis can be integrated in a clinically feasible workflow. - *JACC: Cardiovascular Imaging 12, no. 2 (2019): 252-266.*

8. When training data is limited, the use of additional anatomical information will be beneficial in segmenting the challenging image slices. – *International conference on MICCAI 2019: pp. 523-531*

9. It would be a big win if the results of this thesis could make a positive difference in the lives of others.

10. The worth of ineffective approaches is on par with that of promising outcomes.