└─ I HELMHOLTZ H J IMAGING

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Multi-axes fusing for uncertainty estimation and improved segmentation of biodegradable bone implants in SRµCTs

Segmentation of synchrotron microtomograms (SR μ CTs) is very challenging, both for algorithmic solutions and for domain experts. To characterize biodegradable bone implants based on automatic segmentation, DESY and Hereon investigated the scaling of the 2D U-net for high-resolution volumes using three key model hyperparameters (i.e., model width, depth, and input size). To utilize the 3D information from the SR μ CTs, the prediction is made from multiple viewing directions and then fused by a voting method. In the evaluation, we compare the results by intersection over union (IoU). In summary, combined scaling of the U-net (i.e., all three model parameters are optimized together) and multi-axis prediction fusing with soft voting yields the highest IoU for the least abundant class. The multi-axes prediction allows the computation of uncertainty estimates with very low additional computational cost. Overall, the time needed to segment a single 3D SR μ CT is reduced by an order of magnitude.

I want to give an oral presentation.

yes

I want to present a poster.

yes

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