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Robust Hybrid 3D Image Registration Based On Learned Segments

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Variational image registration methods are a powerful tool in medical imaging. A drawback of these methods is the sensitivity to initialization, which often relies on user input as manual landmark detection. To overcome this difficulty we propose a fully-automated hybrid registration approach, which builds on the great success of artificial intelligence in segmentation of anatomical structures: Given segmentations, we derive features and perform a landmark-based registration followed by an intensity-guided registration. A new coupling regularization is used in both phases of the registration in order to ensure a seamless transformation. Experimental results in 3D show that our registration approach can be easily applied even to challenging medical data, such as lung CT imaging.

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