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Paper Title: Unsupervised Learning-Based Attention-Guided Network for 3D Deformable Medical Image Registration

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## Abstract

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Medical image registration has long been an integrated part of both medical imaging researches and clinical practice. Recently, deep learning-based convolutional neural networks are increasingly utilized instead of traditional registration methods thanks to its convenience, accuracy and speed. However, the potential of attention mechanism in medical image registration has mostly been neglected as the deformation field is inferred directly from raw feature maps. Therefore, it is challenging when the fixed and moving image contain significantly different anatomical information, such as the shape, location and contrast uniformity of the organ of interest. This study proposes an unsupervised learning-based convolutional neural network with the integration of attention modules for better refinement and concentration of feature maps. The auxiliary attention guidance is expected to improve the quality of the displacement field, and consequently lead to the enhancement of the registration performance. We conduct extensive experiments on three public liver datasets and compare to several well-known registration methods to verify the performance of the proposed method. Experimental results show that the proper utilization of attention mechanism improve the accuracy of the 3D deformation medical image registration.

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