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# Fast and Accurate Electron Microscopy Image Registration with 3D Convolution

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Medical Image Computing and Computer Assisted Intervention – MICCAI 2019 • Pages 478–486 • https://doi.org/10.1007/978-3-030-32239-7_53

**Online:** 21 September 2020 Publication History



## *Abstract*

We propose an unsupervised deep learning method for serial electron microscopy (EM) image registration with fast speed and high accuracy. Current registration methods are time consuming in practice due to the iterative optimization procedure. We model the registration process as a parametric function in the form of convolutional neural networks, and optimize its parameters based on features extracted from training serial EM images in a training set.

reconstruct features in the subject image from the reference ones while constraining n the deformation field. Moreover, for the first time, we introduce the 3D

datasets, Cremi and FIB25, demonstrate our method can operate in an unprecedented speed while providing competitive registration accuracy compared with state-of-the-art methods,

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