

Browse ▼

ARTICLE

Fast and Accurate Electron Microscopy Image Registration with 3D Convolution



Authors: [Shenglong Zhou](#), [Zhiwei Xiong](#), [Chang Chen](#), [Xuejin Chen](#), [Dong Liu](#), [Yueyi Zhang](#), [Zheng-Jun Zha](#), [Feng Wu](#)

[Authors Info & Claims](#)

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](#)

0 0



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
in the deformation field. Moreover, for the first time, we introduce the 3D

Feedback

Browse ▼

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,



References

1. Arganda-Carreras, I., Sorzano, C.O.S., Marabini, R., Carazo, J.M., Ortiz-de-Solorzano, C., Kybic, J.: Consistent and elastic registration of histological sections using vector-spline regularization. In: Beichel, R.R., Sonka, M. (eds.) CVAMIA 2006. LNCS, vol. 4241, pp. 85–95. Springer, Heidelberg (2006). https://doi.org/10.1007/11889762_8
2. Balakrishnan, G., et al.: An unsupervised learning model for deformable medical image registration. In: CVPR (2018)
3. Cardona, A., et al.: TrakEM2 software for neural circuit reconstruction. PloS One **7**(6), e38011 (2012)

[Show All References](#)

Comments

[Feedback](#)

Browse ▾

Comments should be relevant to the contents of this article, (sign in required).



0 Comments  **Disqus' Privacy Policy**

 **Tweet**  **Share**

Sort by Newest ▾

Nothing in this discussion yet.

 **Do Not Sell My Data**

[View Table Of Contents](#)

Categories

- Journals
- Magazines
- Books
- Proceedings
- SIGs
- Conferences
- Collections
- People





About

- About ACM Digital Library
- Subscription Information
- Author Guidelines
- Using ACM Digital Library
- All Holdings within the ACM Digital Library
- ACM Computing Classification System

Join

- Join ACM
- Join SIGs
- Subscribe to Publications

Connect

-  **Contact**
-  **Facebook**
-  **Twitter**
- 

The ACM Digital Library is published by the Association for Computing Machinery. Copyright © 2022 ACM, Inc.

[Feedback](#)

[Privacy Policy](#) | [Code of Ethics](#)

Browse ▾



Feedback