
Abstract: Deep learning methods have become the most popular research direction on medical image segmentation, with a large volume of papers having demonstrated superior performance compared to traditional machine learning. In this paper, we comprehensively review major deep learning methods for medical image segmentation, including convolutional neural networks, recurrent networks, self-attention mechanisms, generative models, and transfer learning. In addition, we further review important data augmentation methods from two aspects, general techniques and GANs-based strategies. We also investigate the relationships, advantages, and challenges of these deep learning-based segmentation models. Finally, we discuss two promising research directions with the focus on weakly supervised learning.

Committee:

- Professor Chia-Ling Tsai, Mentor, Queens College
- Professor Chao Chen, Stony Brook University
- Professor Sos Agaian, College Of Staten Island