

A Comparison of Image Segmentation Methods

Image segmentation is a ubiquitous problem across many industries, including the oil and gas industries. Better image segmentation methods will enable more accurate construction, maintenance, and analysis of each of the various stages in developing an asset wherever imaging is used as a modality to gather data describing the asset's current state. Due to improvements in neural networks, image segmentation methods have substantially improved over the last decade, and many practitioners have transitioned away from previous PDE-based level-set methods for segmentation towards machine learning methods. However, in applications with little labeled training data, or where such labels are expensive to acquire, image segmentation via machine learning remains a fundamentally difficult and error-prone task, and as a result these level-set methods are still commonly used.

This poster examines two opposing techniques for image segmentation - level set methods and convolutional neural networks - with the aim of improving the accuracy of these methods while reducing the required amount of data necessary to create a robust, general segmentation model. Specifically, I compare the algorithmic formulations of both CNNs and level sets, and I present examples of how both of these algorithms perform on a sample problem from medical imaging, showing that for this problem, these methods can obtain comparable results.