Universität Basel

Publication

Automatic segmentation of the spinal cord using continuous max flow with cross-sectional similarity prior and tubularity features

Segmenting tubular structures from medical image data is a common problem; be it vessels, airways, or nervous tissue like the spinal cord. Many application-specific segmentation techniques have been proposed in the literature, but only few of them are fully automatic and even fewer approaches maintain a convex formulation. In this paper, we show how to integrate a cross-sectional similarity prior into the convex continuous max-flow framework that helps to guide segmentations in image regions suffering from noise or artefacts. Furthermore, we propose a scheme to explicitly include tubularity features in the segmentation process for increased robustness and measurement repeatability. We demonstrate the performance of our approach by automatically segmenting the cervical spinal cord in magnetic resonance images, by reconstructing its surface, and acquiring volume measurements.