Learning-based Hippocampus Segmentation of Hippocampus in 7.0T MR images

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Abstract

Recent emergence of 7.0T MR scanner sheds new light on the study of hippocampus by providing much higher image contrast and resolution. However, the new characteristics shown in 7.0T images, such as richer structural information and more severe intensity inhomogeneity, raise serious issues for the extraction of distinctive and robust features for accurately segmenting hippocampus in 7.0T images. On the other hand, the conventional image features (e.g., Haar), which were designed for 1.5T and 3.0T images, generally fail to be effective, because of the considerable image artifacts in 7.0T images. In this talk, a novel learning-based method for segmenting hippocampus from 7.0T images based on improved auto-context model in a multi-atlases framework. Furthermore, the concept of unsupervised deep learning is further investigated to learn the hierarchical feature representation directly from the pre-observed image patches in 7.0T images. Promising hippocampus segmentation results were obtained on 20 7.0T images, demonstrating the enhanced discriminative power achieved by our learning-based method.

Dr. Minjeong Kim received her Ph.D. degree in computer science and engineering from Ewha Womans University, Seoul, Korea. She is currently working at IDEA research lab in University of North Carolina, Chapel Hill as a research associate. She has published a number of papers regarding image registration, segmentation as well as machine learning approaches in medical image analysis and computer aided diagnosis. She also served as a reviewer for top-tier journals and conferences as well as a committee member for international workshops in medical image analysis society.

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