

Atlas based segmentation of 6-month-old infant brain MR images

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Distinguishing the tissue types in infant brain MR images represents a great challenge both for human experts and automatic algorithms, because the intensity of pixels belonging to various tissues are very similar. This paper presents a method and its challenges as well as its effectiveness in building a statistical atlas from the learning data. In the segmentation of a new infant brain, our atlas can tell for every pixel the likelihood of belonging to each tissue. When we train a machine learning algorithm to segment infant brain MR images based on pixel intensities, the atlas provides additional information to the algorithm, which thus will be able to determine more accurately the assignment of pixels to tissues. The advantages provided by the atlas are demonstrated with several machine learning algorithms.

Keywords: magnetic resonance imaging, atlas-based segmentation, machine learning.