

Automatic Multi-atlas-based Cartilage Segmentation from Knee MR Images

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1 Introduction

Osteoarthritis (OA) is the most common form of joint disease and is characterized by cartilage loss. An accurate cartilage segmentation from magnetic resonance (MR) knee images is crucial to study OA. Due to the size of image databases acquired for OA studies, a fully automatic segmentation is needed.

In this paper, we therefore discuss a new automatic cartilage segmentation method from knee magnetic resonance (MR) images. The method is a step towards automatic analysis of large OA image databases.

2 Method

We first perform bone segmentation with spatial priors obtained from multi-atlas registration and local likelihoods from image intensities. Then we compute spatial priors for femoral and tibial cartilage through multi-atlas registration based on bone segmentations. The spatial priors are then integrated into a Bayesian framework where the likelihoods are provided by a probabilistic k nearest neighbor (k NN) classification. Refer to [1] for detailed description of the method.

Different from [1], we integrate the cartilage probabilities into a three-label segmentation framework [2] to allow for spatial regularization on the cartilage segmentation.

3 Conclusion

We presented an automatic multi-atlas-based cartilage segmentation method.

References

1. Shan, L., Charles, C., Niethammer, M.: Automatic multi-atlas-based cartilage segmentation from knee MR images. *IEEE International Symposium on Biomedical Imaging: From Nano to Macro* (2012)
2. Shan, L., Zach, C., Niethammer, M.: Automatic three-label bone segmentation from knee MR images. *IEEE International Symposium on Biomedical Imaging: From Nano to Macro* (2010) 1325–1328