A variational framework integrating distortion correction, segmentation and cortical parcellation on diffusion MRI

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***Abstract*—In whole-brain connectivity analysis of diffusion MRI (dMRI) data, an accurate delineation of the white-matter and grey-matter surfaces is required. While high-standard segmentation is readily available for anatomical MRI, such as T1-weighted, dMRI typically have lower resolution and severe geometrical distortions. We propose a dMRI segmentation-registration framework that exploits the detailed anatomy extracted from anatomical MRI as shape-prior. We use an "active contours without edges"-like model to look for a deformation field that optimally maps the shape prior on the multivariate features in diffusion space. This joint approach reflects the intrinsic coupling of segmentation and distortion correction. Complementary, a precise and consistent cortical parcellation on dMRI is straightforward by projection from T1 space. Thus, we expect to improve the reliability and robustness of the resulting connectivity networks and their comparability within and across subjects. First results on synthetic datasets and simulated dMRI confirm the effectiveness of our approach.**

***Index Terms*—diffusion MRI, susceptibility distortion, segmentation, registration, parcellation, shape-prior.**

I. Introduction

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II. Conclusion

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Appendix A
Proof of the First Zonklar Equation

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Appendix B

Appendix two text goes here.

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References

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