Correspondence Transfer for the Registration of Multimodal Images

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Abstract

Gene expression data provides information on the location where certain genes are active; in order for this to be useful, such a location must be registered to anatomical atlases. Because gene expression maps are considerably different from each other – they display the expression of different genes – and from the anatomical atlas, this problem is currently addressed either manually by trained experts, or by neglecting all image information and only using the pre-segmented boundaries. In this manuscript we concentrate on the study of data discrepancy measures to take into account image information when this is present in both the target and template images. We exploit such "bi-lateral" structures to drive the correspondence process in regions where the intensity information is inconsistent, analogously to a "motion inpainting" task. Although no ground truth can be established, and prior information clearly plays a key role, we show that our model achieves desirable results on subjective tests validated by expert subjects. We also present results that highlight the limitations of our approach, and discuss further development to address this scientifically important problem.