

Longitudinal measurement of the developing thalamus in the preterm brain using multi-modal MRI

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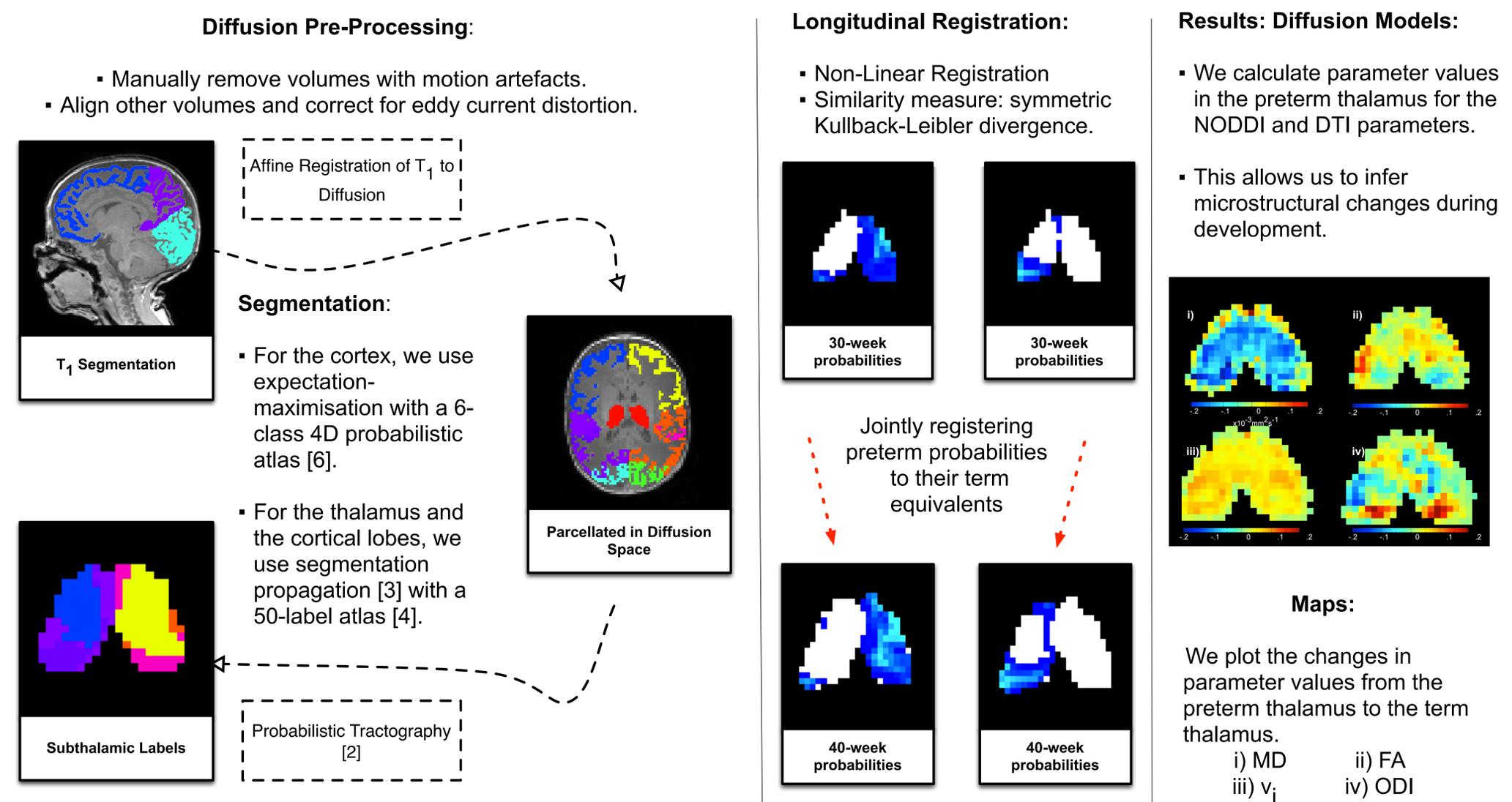
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Motivation: Infants born extremely preterm are more likely to experience cerebral palsy, sensory and motor disability and cognitive impairment [7].

The Thalamus is a relay centre for communication with the cerebral cortex and its development is affected by prematurity [1]. Using MRI to noninvasively monitor its growth may reveal specific deficits early in development.

Methods: We present a method to register the thalamus between preterm and term timepoints based on its substructure inferred from probabilistic tractography [2]. After registration, we compare diffusion parameter changes in both the NODDI model [9] and DTI.



Discussion: We register intra-subject and thus we ensure that thalamic labels correspond to each other during development. The registration represents anatomical changes that happen during development. Because of the importance of thalamic development to cognitive health, early measures of integrity are crucial.

Future Work: Preterm infants often have motor disability. We aim to investigate this by investigating thalamo-cortical connections to the motor cortex in tandem with quantifying the ongoing cortical folding.

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