High Definition Tractography Networks

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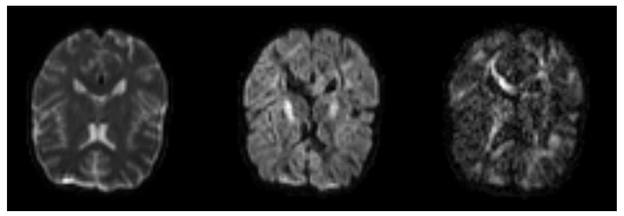
Background



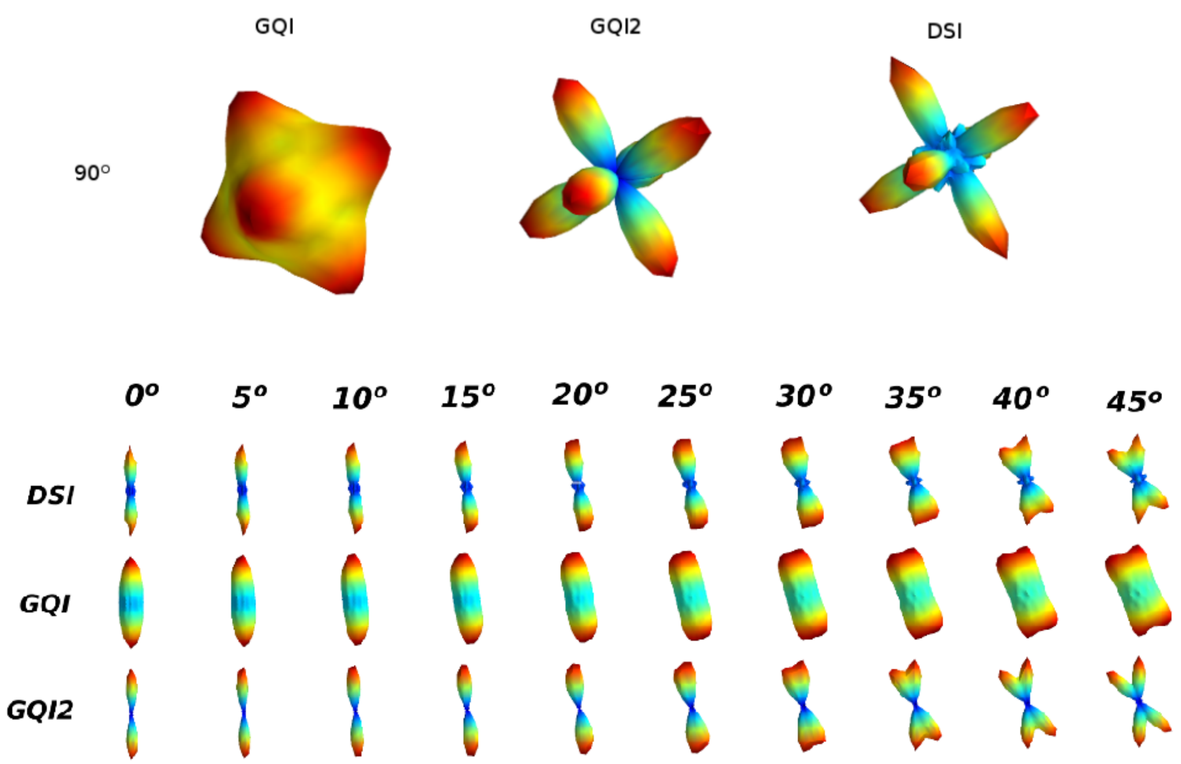
Diffusion-weighted MR imaging (dMRI) is a non-invasive technique which can reveal important information about the directional organisation of the white matter fibres of the brain.

Tractography is a way to approximate these neuronal pathways using streamlines and connectivity profiles.

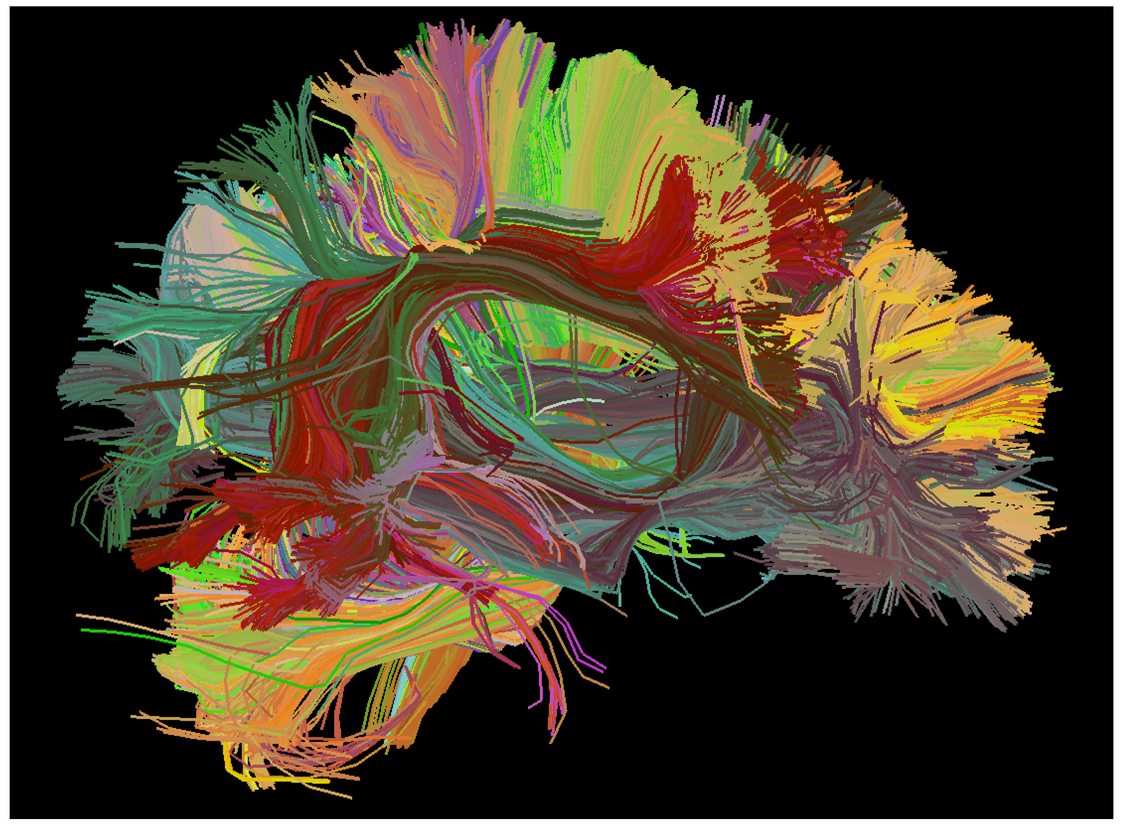
Deriving tractography from the raw MR data calls for a wide range of signal processing, medical imaging and machine learning techniques.

Reconstruction

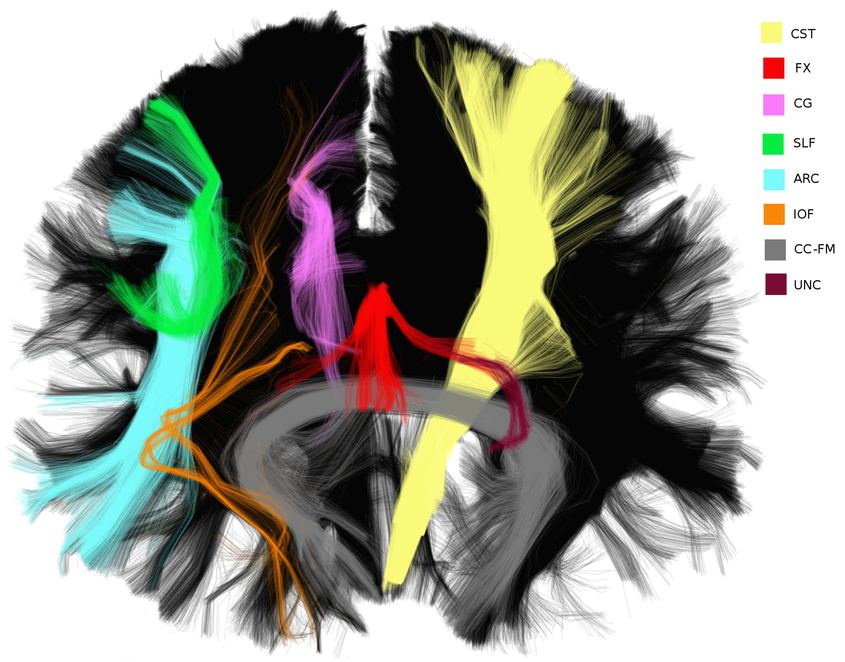
$$\psi_{GQI2} = \mathbf{s} \cdot \mathrm{H}((6D.G \circ \mathbf{b} \circ \mathbb{1}) \cdot G)\lambda^3/\pi$$



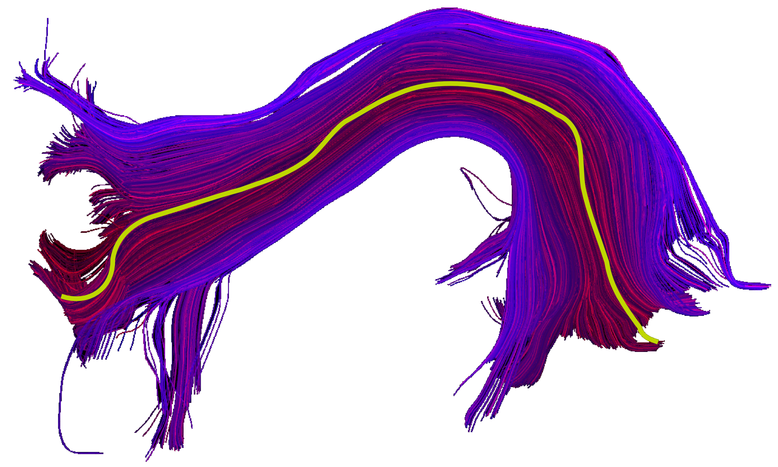
Tracking



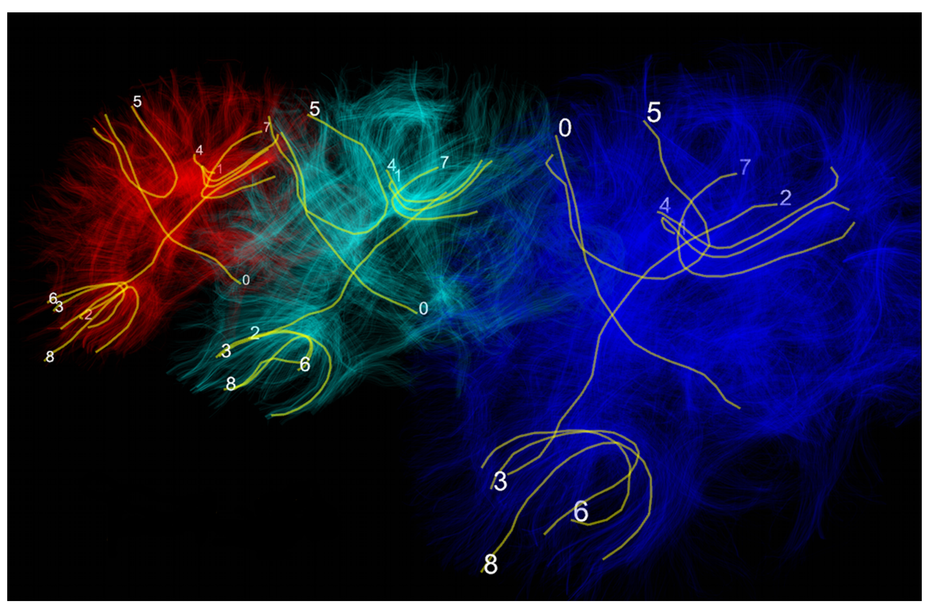
Segmentation & Interaction



Bundle Stats



Across Subjects



Graph Theory

Network theory can be used at all levels of tractography analysis.

A tractography is a network of approximated neuronal fibre pathways.

We have further advanced the methods towards high definitions.

We provide state-of-the-art software for analysing these data sets and a solid ground for further implementetion of graph-theoretic approaches.

[1] Garyfallidis et al. (2012) Towards an accurate brain tractography.

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