SPECTRE

The visualization of diffusion MRI related properties in a comprehensive way is still a challenging problem. Reisert et al. propose a simple visualization technique to give neuroradiologists and neurosurgeons a more direct and personalized view of relevant connectivity patterns estimated from clinically feasible diffusion MRI. The approach, named SPECTRE (Subject sPEcific brain Connectivity display in the Target REgion), is based on tract-weighted imaging, where diffusion MRI streamlines are used to aggregate information from a different MRI contrast. Instead of using native MRI contrasts, we propose to use continuous template information as the underlying contrast for aggregation. In this respect, the SPECTRE approach is complementary to normative approaches where connectivity information is warped from the group level to subject space by anatomical registration. For the purpose of demonstration, they focus the presentation of the SPECTRE approach on the visualization of connectivity patterns in the midbrain regions at the level of the subthalamic nucleus due to its importance for deep brain stimulation. The proposed SPECTRE maps are investigated with respect to plausibility, robustness, and test-retest reproducibility. Clear dependencies of reliability measures with respect to the underlying tracking algorithms are observed [1].

[1]

Reisert M, Kaller CP, Reuter M, Urbach H, Sajonz BE, Reinacher PC, Coenen VA. SPECTRE-A novel dMRI visualization technique for the display of cerebral connectivity. Hum Brain Mapp. 2021 Feb 27. doi: 10.1002/hbm.25385. Epub ahead of print. PMID: 33638289.

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