

Shape Analysis of 3D SDOCT data

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Abstract: The eye's retina is formed during embryogenesis from neural tissue and can thus be considered part of the central nervous system (CNS) with similar structure and cellular composition like the brain. Spectral domain optical coherence tomography (SDOCT) non-invasively acquires high-resolution, three-dimensional (3D), cross-sectional images of biological tissues in vivo, producing in-depth views of the retina. Our talk is mainly focused on the tools that enable us to morphometrically determine the retinal changes for healthy controls and for patients with different neurological diseases. Our talk is divided into two parts. In the first part, we will discuss about the shape modelling of a specific part (fovea) of the retina using Cubic Bezier spline and we derived several 3D shape parameters, which help to diagnose several structural changes in neurodegenerative and neuroinflammatory diseases. In second part, we will discuss about the shape analysis of the optical nerve head (ONH), where all nerve fibers converge to form the optic nerve, which connects the retina with the visual brain areas. The shape analysis of ONH includes ONH mesh denoising using the bilateral normal method in a robust statistics framework, ONH shape registration, mean shape reconstruction and several ONH shape parameters which investigates the changes in neurodegenerative diseases.

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