NeuroQLab – A Software Assistant for Neurosurgical Planning and Quantitative Image Analysis

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Neuroimaging techniques produce large amounts of data capable of displaying a wide variety of structural and functional properties of the brain. A large number of specialized image analysis and visualization tools exist that aim at helping the physician in analyzing and dealing with the data. We present a flexible and extendible software assistant covering a number of typically required tools for evaluating neuroimaging studies. It comprises tools for preprocessing tasks such as registration, skull-stripping or non-uniformity normalization as well as some dedicated packages for quantitative analysis of anatomical images, a toolkit for DTI analysis as well as a tool for analyzing fMRI studies. The software assistant is built upon an established platform for rapid-prototyping, which facilitates fast integration of new features by user request as well as the adaption of given features to concrete clinical questions. In this paper, a brief overview of the basic underlying software architecture is given accompanied by a presentation of selected tools offered by the software.
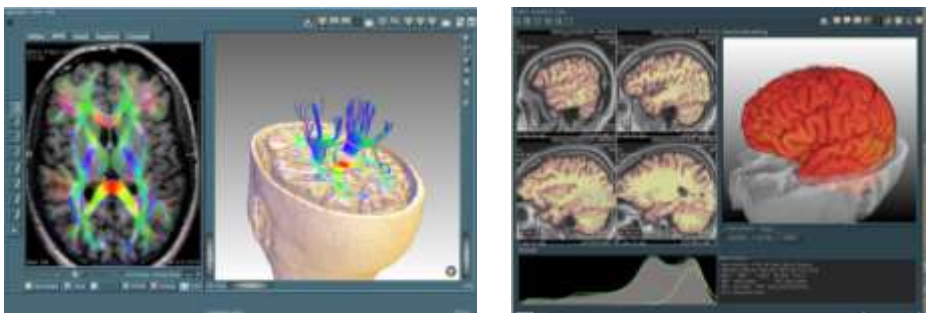

Fig. 1: Left: An example of synchronized 2d- and 3d-viewers showing DTI color-coded data and reconstructed fiber tracts. Right: Color-enhanced rendering of the results of quantitative brain volumetry.