



Abstract: MITK-ModelFit

Generic Open-Source Framework for Model Fitting

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Model fitting is employed in numerous medical imaging applications for quantitative parameter estimation. Prominent examples include pharmacokinetic modelling of dynamic contrast-enhanced (DCE) MRI data and apparent diffusion coefficient calculations. There are many fitting tools available, however most of them are limited to a special purpose and do not allow for own development and extension. In this work, we present MITK-ModelFit [1], a truly open-source and operating-system-independent fitting framework embedded as a package into the medical imaging interaction toolkit (MITK). The MITK-integration allows for easy data import/export and inclusion into workflows using pre-and post-processing steps such as segmentation and registration. MITK-ModelFit provides ready-to-use libraries for fitting, fit quality evaluation and result visualization. The software design was chosen such that the framework is highly adaptable to various use-cases and easily extendable for developers. The abstraction between model, data and fit representation makes the framework easily adaptable to any fitting task, independent of modality, fitting domain, fitting strategy or applied model. Further it achieves a high versatility regarding the support of different fitting workflows. As an example, an extensive toolbox for pharmacokinetic analysis of DCE MRI data is available with both, interactive and automatized batch processing workflows.

References

1. Floca R, Debus C, Ingrischi M, et al. MITK-ModelFit: A generic open-source framework for model fits and their exploration in medical imaging - design, implementation and application on the example of DCE-MRI. *BMC Bioinformatics*. 2019;20(21).