Bayesian Inference of Spatial Vascularity Parameters from Ultrasound Data

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Abstract

The perfusion of the tumor is a great indicator of the treatment success in liver cancer patients. Therefore a framework for the reconstruction of the ccontrast flow field from ultrasound data is required. Ultrasound imaging wih its low-cost and broad availibility would enable regular short-interval checkups and aid the personalization of the cancer treatment but comes with the cost of its high noise and low resolution compard to other imaging techniques.

In my talk I will introduce the underlying tracer-kinetic field model and the Bayesian inference-type reconstruction of the flow field and perfusion [1,2]. Additionally, I will present the current process on the incorporation of spatially dependent parameters as well as their efficient predicition with Markov Chain Monte Carlo based methods.

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[1] Steve Sourbron (2014): *A Tracer-Kinetic Field Theory for Medical Imaging*, IEEE Transactions on Medical Imaging, 33 (4). [2] Mukesh K. Ramancha et al. (2022): *Bayesian updating and identifiability assessment of nonlinear finite element models.*, Mechanical Systems and Signal Processing, 167, 108517.