Seminar über Biomedizinische Photonik

Referent/in: Janek Gröhl, German Cancer Research Center (DKFZ), DE-Heidelberg
Titel: Data-driven quantitative photoacoustic imaging

Photoacoustic imaging (PAI) is a modality with great potential to measure optical absorption deep inside tissue, quantification of the measurements remains a major challenge. The seminar talk will present and discuss several machine-learning based approaches to quantitative PAI (qPAI) that were developed and experimented with in the Computer Assisted Medical Interventions (CAMI) lab at the German Cancer Research Center (DKFZ). One of these methods - Context Encoding (CE)-qPAI - encodes relevant information of the initial pressure distribution and the characteristics of the imaging system in voxel-based feature vectors, which potentially allow the generation of many training samples from a single simulated PA image. In silico experiments suggest that CE-qPAI enables highly accurate and robust quantification of the local fluence and thereby the optical absorption from initial pressure images. With another method, we directly estimate the fluence and absorption coefficients from 2D initial pressure images as well as raw time series data and introduce a framework with which to estimate confidence in the predictions and show that discarding estimates below a reliability threshold can increase quantification accuracy.

Zeit: Mittwoch, 17.04.2019, 10:15 Uhr

Ort: Hörsaal A97, Gebäude Exakte Wissenschaften, Sidlerstrasse 5, Bern, Schweiz