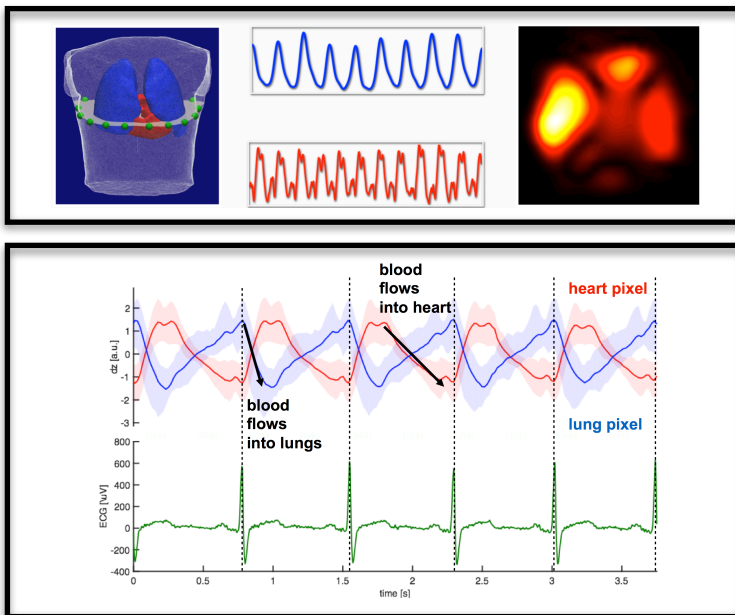


Master thesis

Separation, Analysis and classification of the cardiac dependent EIT signal component using an MRI based reconstruction model

Motivation

Assessing the regional blood flow within the lung potentially helps to identify and treat pulmonary vascular diseases and might even support mechanical ventilation. Especially for guiding mechanical ventilation, bedside monitoring of both regional ventilation and pulmonary perfusion is desirable. Electrical Impedance Tomography (EIT) is a non-invasive imaging modality providing functional images of relative impedance changes induced by regional ventilation and blood volume changes, so-called cardiac induced impedance changes.



Tasks

In this project, a very small study shall be planned, conducted and executed comprising EIT, ECG and MRI data. An anatomically correct reconstruction model shall be created for a 2D EIT reconstruction. Additionally, the reconstructed cardiac dependent EIT signal components shall be analyzed and classification shall be performed to distinguish between different anatomical and physiological regions.

Requirements

- Programming skills in Matlab/Python/C++
- Strong fundamentals in topics such as signal processing, image processing, image reconstruction and machine learning
- Experience in the execution of small biomedical studies
- Ideally some fundamentals of cardiopulmonary physiology

Field of Research

Understanding and monitoring cardiopulmonary coupling

Project

Investigation of regional pulmonary perfusion using Electrical Impedance Tomography (EIT)

Areas

Signal processing
Software programming
Image processing
Image reconstruction

Field of Studies

Electrical Engineering
Computer Science
Physics

Starting Date

October 2016

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