



Internship/Study Project

Laboratory for Biomedical Microtechnology – Prof. Dr.-Ing. Thomas Stieglitz

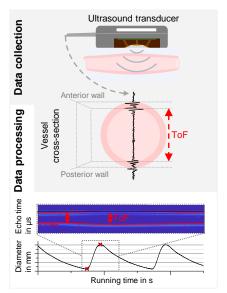
Topic: Comparative Analysis of Time-of-Flight Methods for Echo Extraction

Introduction

Ultrasound plays a crucial role in medical diagnosis and treatment. This research examines how algorithms impact ultrasound accuracy, particularly in signal analysis and post-processing. It focuses on various Time-of-Flight (ToF) extraction methods in ultrasound imaging. The straightforward threshold method for echo detection may have limited resolution, while the cross-correlation method shows potential by measuring signal delays using peak time indexes. However, there is a lack of comparative research on the accuracy of these algorithms.

Objectives

Comprehensive analysis and comparison of different ToF extraction techniques.



Your tasks

- Analysis of the data provided from in-vitro and ex-vivo experiments.
- Application of different methods (Hilbert-Transform, cross-correlation, short-time Fourier Transform) to the echoes and determination of arterial diameter and arterial thickness.
- Determination of the blood pressure from the data above. Which is the most accurate method? Which are the errors introduced?
- Presenting results and writing the report.

Your profile

- You have experience with programming and enjoy it (programming language can be discussed).
- You are motivated.
- You can work in a concentrated, focused and structured way.

Logistics

- Location: Campus for Intelligent Machine-Brain Interfacing Technology (IMBIT)
- Earliest starting date: October 2023 (can be discussed)

Contact

M.Sc. Carolina Seabra Laboratory for Biomedical Microtechnology Department of Microsystems Engineering (IMTEK) IMBIT // NeuroProbes University of Freiburg

Georges-Koehler-Allee 201 (Room 01.027) E-Mail: <u>carolina.seabra@imtek.uni-freiburg.de</u> URL: <u>www.imtek.de/bmt</u>