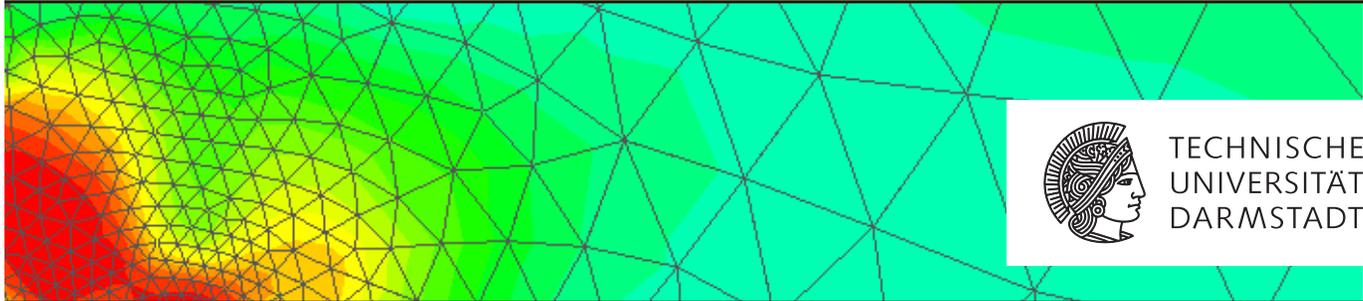# Beamformer control for hearing glasses and aids

PhD Thesis: Ad-hoc speaker tracking in hearing devices for the control of a beamformer

Paid scholarship, sponsored by Sivantos GmbH, Erlangen

Computational Engineering / Elektrotechnik und Informationstechnik;   Start: June/July 2016 or later

Project Topic

State-of-the-art beamformers typically amplify signals of the look-direction of a hearing aid user and allow a significant improve of speech intelligibility in noisy environments. In natural conversations, however, one typically does not continuously focus the target speaker. As a normal hearing person, nevertheless, one is able to understand the speaker, even in noisy environments. Beamformers with a frontal target beam, however, lose then the focus of the speaker resulting in a significant loss of speech intelligibility.

The task of this thesis is to develop a procedure which allows tracking of a target speaker in noisy environments - even at the presence of other speakers - and steer the beamformer appropriately. The target speaker should be learned ad-hoc, meaning during the communication in order to differentiate him from other signals or speakers. For the investigations of the beamformer a prototype of hearing glasses can be used with four microphones in each of the glasses' earpiece. An implemented beamformer for this prototype with frontal focus can be used as starting point of the thesis.

Topics of the work

- Familiarization with the topic of beamformers and speaker recognition.
- Setup of realistic simulation environment for tests of the following algorithms to be developed.
- Identification of the direction of arrival of point sources which include the target speaker.
- Differentiation of the point sources in speech and other audio signals.
- Investigations of procedures for a fast learning of preferred speakers.
- Control of the beamformer using the knowledge of the direction of arrival of the target speaker.

Prerequisites

Master of etit, Focus on Digital Signal Processing with very good results.

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