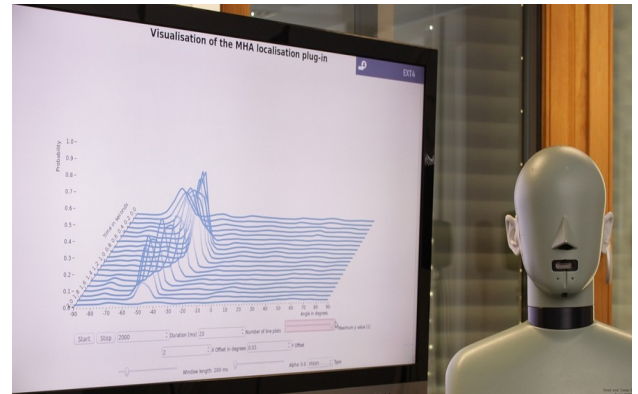


Master thesis

„Interaction strategies of head motion and direction-of-arrival estimation“

Background: Hearing devices can apply direction-of-arrival (DOA) estimation to steer beamformers towards the sources. Direction of arrival is typically estimated based on acoustic cues, such as interaural time difference. The signals are recorded at the ears of the listener. This means that the estimated directions are in the head coordinate system. Head motion of the listener can be measured to transform the head coordinate system into a global coordinate system. Moreover, the comparison of ITD fluctuations with angular velocity of the head might lead to further cues which can be used to compensate of the estimation error if the source is not in the horizontal plane.



Aim: You will expand your knowledge about digital signal processing and learn how to implement algorithms. Moreover, you will learn how to evaluate the implemented algorithms using acoustic simulations. Results could help to improve DOA estimators based on head motion.

Approach: In this master thesis you work with DOA estimators implemented in the openMHA hearing aid prototyping platform. Movements and acoustic stimuli will be simulated with the TASCAR toolbox for acoustic scene creation and rendering. You will modify existing algorithms and develop new methods in Matlab and/or C++ (openMHA).

Required background and skills: Matlab and/or C++ programming skills, practical and theoretical experience in digital signal processing.

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Literature:

Kayser, H., Anemüller, J., "A discriminative learning approach to probabilistic acoustic source localization," In International Workshop on Acoustic Echo and Noise Control (IWAENC 2014), pp. 100 - 104, Antibes, France, 2014.

Herzke et al. (2017): Open signal processing software platform for hearing aid research (openMHA). In Proc. Linux Audio Conference.

Grimm et al. (2015): Toolbox for acoustic scene creation and rendering (TASCAR): Render methods and research applications. In Proc. Linux Audio Conference.