Lehrstuhl für Multimediakommunikation und Signalverarbeitung
Universität Erlangen-Nürnberg

Proposal for a Master Thesis

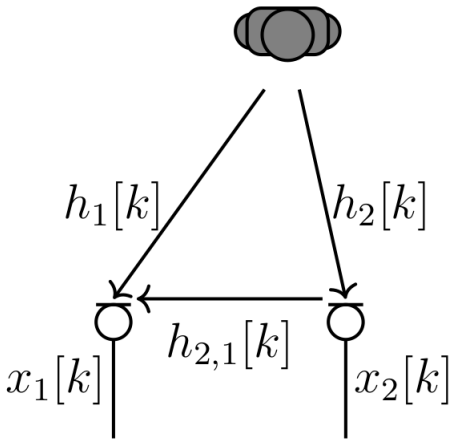
Topic: **Machine Learning-based Reconstruction of Relative Transfer Functions**

Description: The identification of a relative transfer function (RTF) between the signal components in two microphones evoked by a single acoustic source is an important component of multichannel communication systems in noisy and reverberant environments. However, especially in noisy environments or in case of weak excitation of certain frequencies, the RTF identification exhibits poor accuracy.

To overcome such shortcomings, mathematical models can be used to reconstruct the RTF from imperfect measurements. These include a priori learned geometric structures of RTFs from the area of potential source positions, i.e., manifold learning [1], and compressed sensing approaches for the reconstruction of the RTF from incomplete measurements [2].

The aim of this thesis is the implementation and evaluation of supervised RTF estimation algorithms which are able to determine RTFs from imperfect measurements starting with [1] and [2]. The implementation should be done in MATLAB.

As prerequisites, the student should have basic MATLAB programming experience and an affinity to math.



[1]: R. Talmon, and S. Gannot. "Relative Transfer Function Identification on Manifolds for Supervised GSC Beamformers." EUSIPCO, 2013.

[2]: Z. Koldovský, J. Malek, and S. Gannot. "Spatial Source Subtraction Based on Incomplete Measurements of Relative Transfer Function." IEEE/ACM TASLP 23, no. 8 (Aug. 2015): 1335–47.

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Available: Immediately