

Proposal for a Master Thesis

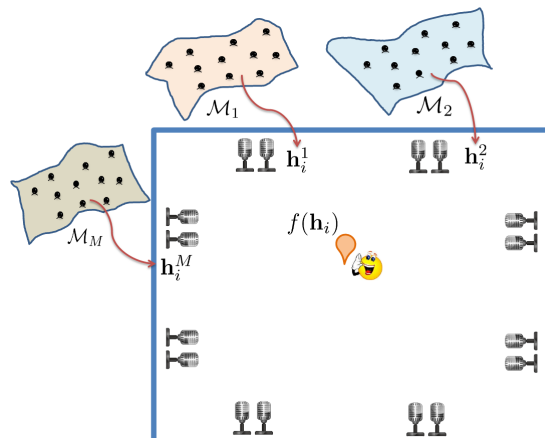
Topic: Acoustic Source Tracking using Manifold Learning

Description: The aim of acoustic source localization is to estimate the position of one or several sound sources from observed microphone signals. For moving sources usually a tracking algorithm is appended, which exploits prior knowledge about the source movement to enhance position estimates.

Most of the state-of-the-art acoustic localization algorithms are based on Direction of Arrival (DoA) estimation with subsequent triangulation. However, these approaches are known to degrade in adverse acoustic scenarios such as large reverberation times, high noise levels or low direct-to-reverberation ratios. Recently, manifold learning techniques have been developed which learn a mapping from high-dimensional observations to the underlying source positions and can deal also with very challenging acoustic scenarios due to their adaptation to the situation at hand. Additionally, tracking schemes for these methods have been proposed.

The aim of this thesis is the implementation and evaluation of manifold learning-based acoustic source tracking algorithms. The interpretation of the algorithms on a theoretical level is also part of this work.

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



Gannot: Keynote Talk, ITG Oldenburg 2018

[1]: Laufer-Goldshtein et al.: *Speaker Tracking on Multiple-Manifolds with Distributed Microphones*, LVA/ICA. Grenoble, France, 2017.

[2]: Laufer-Goldshtein et al.: *A Hybrid Approach for Speaker Tracking Based on TDOA and Data-Driven Models*, IEEE/ACM TASLP 26, no. 4 (April 2018): 725–35.

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