

Master thesis

Impact of diffuse and disturbed reflections on room geometry inference algorithms

Description

Room geometry inference (RGI) is concerned with the localization of reflective boundaries in an enclosed space. Certain algorithms are able to perform RGI based on acoustic measurements. However, the vast majority of these algorithms rely on the room-acoustic image source model, which assumes specular reflections. In real use cases, both specular and diffuse reflection occurs, and the assumed specular reflection path is disturbed.

In this master thesis, diffuse and disturbed reflection will be studied in the context of RGI, and its influence on the success of an existing state-of-the-art RGI algorithm will be assessed. For this task, acoustic diffuse reflection, similar to optical diffuse reflection, will be investigated with the aim of producing an appropriate characterization of it, and method for simulating it. Based on both the results of such a simulation and also on real data, these reflection mechanisms and their impacts will be elucidated, and any deleterious effects thereof will be addressed.

Related topics

- Acoustic wave propagation (diffraction, reflection etc)
- Room geometry inference
- Echo labelling
- Image source model
- Acoustic imaging

Prerequisites

- Excellent signal processing and acoustics knowledge
- Very good MATLAB programming skills

Supervisor

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