

Proposal for a Master thesis

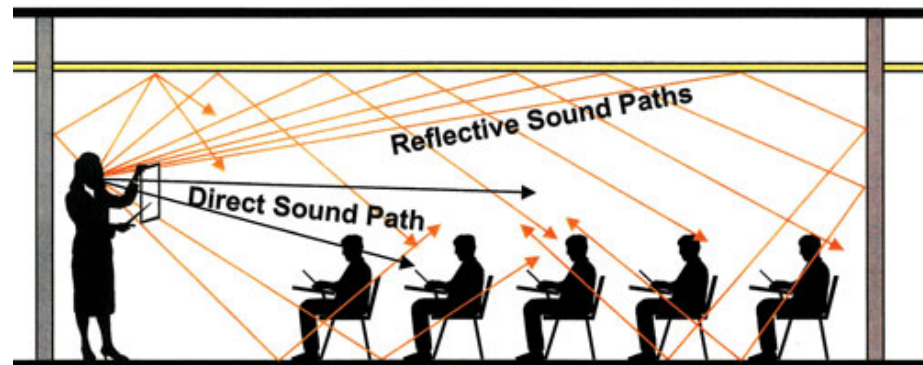
Topic: Dereverberation with the Weighted Prediction Error Method

Description: A speech signal recorded in a room will inevitably be affected by reverberant components produced by the reflections of sound waves on walls or objects in the acoustic environment. Reverberation is detrimental to the perceived quality of the observed speech signal and often makes human-machine interaction more challenging.

The goal of dereverberation is to reduce the energy of reverberant components in the recorded signal to lower the aforementioned detrimental effects. A powerful approach to dereverberation is the weighted prediction error (WPE) method [1], which requires no prior knowledge of the room transfer functions. The estimated dereverberation filter is not necessarily the precise inverse filter of the room transfer functions, but a filter that effectively reduces the energy of the reverberant components.

The aim of this thesis is the implementation and the evaluation of the WPE algorithm and promising variants of it. This includes a literature survey and the investigation of novel approaches for different acoustical scenarios.

As prerequisites, the student should have basics in statistical signal processing and basic MATLAB programming experience.



http://mcgrawimages.buildingmedia.com/CE/CE_images/2012/Hay_BondedLogic_3a.jpg

[1]: Nakatani, T., Bing-Hwang, J., Yoshioka, T., Kinoshita, K., Delcroix, M., and Miyoshi, M. "Speech Dereverberation Based on Maximum-Likelihood Estimation With Time-Varying Gaussian Source Model." IEEE Trans. on Audio, Speech, and Language Proc. 16, no. 8 (Nov. 2008): 1512–27.

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