Characterization of feedback management systems of commercial hearing aids

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Spriet, Ann[1]
Madhu, Nilesh[1]
Wouters, Jan[1]
Moonen, Marc[1]
Bisitz, Thomas[2]
Hohmann, Volker[2]

[1]K.U. Leuven, Belgium
[2]Hoertech gGmbH Oldenburg

Abstract

Today's hearings aids have commonly integrated systems for feedback management. A huge variety of algorithms exists with the objective to control feedback effectively while achieving a high added stable gain, good sound quality and with a fast adaptation to changes in feedback paths.

A setup for the evaluation of commercial hearing aids was designed with the objective to develop a set of repeatable and perceptually relevant objective measures of feedback behaviour. The setup is based on a dummy head set up in a room with a short reverberation time. A linear motor system is used to bring different types of obstruction to the head (telephone receiver, board). Responses of 10 hearing aids from 5 manufacturers with different feedback-reduction schemes with an open coupling and a closed coupling have been recorded at two test sites. 11 signals (speech, noise, ISTS, music) where presented at 20 audiogram settings (i.e., different gain settings).

Several objective measures for feedback evaluation which detect the presence and amount of feedback and signal distortion were calculated from the recorded signals. Furthermore, the insertion gain was estimated as a function of input level. Reproducibility was measured both within and across test sites. An overview of the results is presented, and we shall discuss which subset of measures and signals could be promising for the characterisation of feedback systems.