

Distributed microphone array signal processing for hearing aids

Simon Doclo

Institute of Physics - Signal Processing Group
University of Oldenburg, Germany

simon.doclo@uni-oldenburg.de

Microphone arrays have become essential for performing noise reduction and source localization in a broad range of speech communication applications, such as hands-free mobile telephony, videoconferencing systems and hearing aids. Whereas in many applications the microphones are wired, the position of the microphones in the array is fixed and all signal processing is performed on a centralized processor, in some applications several microphone arrays are exchanging information with each other, e.g. using a wireless link, and are cooperating in order to achieve a common objective. In this talk, we will present some recent developments in the area of distributed signal processing for such acoustic sensor networks. As a prototype example, we will focus on signal enhancement for binaural hearing aids, where the objective is not only to selectively extract the useful speech signal and suppress background noise, but also to preserve the binaural localization cues of the sound sources, so as to preserve the auditory impression of the acoustic scene and exploit the binaural hearing advantage. In addition, we will discuss the influence of the available capacity of the wireless link on the performance of these signal enhancement algorithms.



Simon Doclo received the M.Sc. degree in electrical engineering and the Ph.D. degree in applied sciences from the Katholieke Universiteit Leuven, Belgium, in 1997 and 2003, respectively. From 2003 to 2007, he was a Postdoctoral Fellow with the Research Foundation - Flanders at the Electrical Engineering Department (Katholieke Universiteit Leuven) and the Adaptive Systems Laboratory (McMaster University, Canada). From 2007 to 2009, he was a Principal Scientist with NXP Semiconductors at the Sound and Acoustics Group in Leuven, Belgium. Currently, he is a Professor at the Institute of Physics, University of Oldenburg, Germany. His research activities center around signal processing for acoustical applications, more specifically microphone array processing, active noise control, acoustic sensor networks and hearing aid processing.

Prof. Doclo received the Master Thesis Award of the Royal Flemish Society of Engineers in 1997 (with Erik De Clippel), the Best Student Paper Award at the International Workshop on Acoustic Echo and Noise Control in 2001, the EURASIP Signal Processing Best Paper Award in 2003 (with Marc Moonen) and the IEEE Signal Processing Society 2008 Best Paper Award (with Jingdong Chen, Jacob Benesty, Arden Huang). He is a member of the IEEE Signal Processing Society Technical Committee on Audio and Electroacoustics. He has been secretary of the IEEE Benelux Signal Processing Chapter (1998-2002), and has served as a guest editor for the EURASIP Journal on Applied Signal Processing.