PROCEEDINGS of the
23rd International Congress on Acoustics
9 to 13 September 2019 in Aachen, Germany

Investigating uncertainties in fast HRTF measurements

Shaima'a DOMA[(1)], Hark BRAREN[(1)], Janina FELS[(1)]

[(1)]Teaching and Research Area of Medical Acoustics, Institute of Technical Acoustics, RWTH Aachen University, Germany,
{shaimaa.doma, hark.braren, janina.fels}@akustik.rwth-aachen.de

Abstract

In personalized binaural synthesis, the use of individual head-related transfer functions (HRTFs) promises improved auditory immersion and localization performance, compared to generic HRTFs. A direct way of acquiring individual HRTFs is via acoustical measurements. At the Institute of Technical Acoustics of RWTH Aachen University, a measurement arc with 64 loudspeakers has been developed and optimized for this purpose, performing a fast measurement whilst rotating continuously around the subject. Optical tracking allows an investigation into positional uncertainties of the arc, as well as into subject movement. A real-time feedback system further indicates the subject's current deviation from the desired position and orientation, hence allowing for correction. Previous evaluation approaches of the measurement system are expanded in this study. A series of human HRTF measurements is conducted, together with 3D structured light head scans of the subjects, which can be used for Boundary Element Method (BEM) simulation of the HRTF. By means of objective distance measures, differences between HRTFs, as well as repetition errors are quantified and measurement accuracy is assessed.

Keywords: Individual HRTFs, measurement accuracy, distance measures