

From Speech Communication to Audio Communication

Jens Ahrens, Jan-Niklas Antons, Sebastian Möller

Quality and Usability Lab / Telekom Innovation Laboratories
University of Technology Berlin
Ernst-Reuter-Platz 7
10587 Berlin
Germany

jens.ahrens@tu-berlin.de

Abstract

Telecommunications have a history of more than an entire century. At the very beginning the decision was made to heavily limit the bandwidth of the transmitted speech signals in order to be able to make more efficient use of the infrastructure. Until today this bandwidth limitation has stayed largely untouched. As a consequence, the expectations of telephone users have widely adapted to the perceptual quality of bandwidth limited speech. Many of the signal processing methods that have been created for speech heavily exploit the relatively low expectations of the users and can be very aggressive. High fidelity audio processing algorithms on the other hand tend to be much gentler but also require more resources. The very different prerequisites and goals often make researchers consider speech and audio processing as separate disciplines both with respect to the algorithm design and with respect to perception. As bandwidth and processing power keep on increasing new possibilities for making speech and audio processing converge into one discipline arise. In this paper, we give an overview over the benefits that the use of high fidelity signals in speech communication provides. We will discuss what improvement can be expected when moving from narrowband to wideband, to super-wideband speech transmission, and to spatial audio transmission, in terms of overall quality, speaker recognizability, and intelligibility, both for humans and for automatic classification algorithms.