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A method for personalized sound experience

First-rate sound for every listener

Developing an audio device that offers optimum sound experience to all people is not easy. The great challenge is that each person has their own listening preferences. For this reason, the Oldenburg Branch for Hearing, Speech and Audio Technology HSA of the Fraunhofer Institute for Digital Media Technology IDMT has developed adaptive algorithms as well as intuitive methods for adjusting personal sound. Together with a customer, this technology has now been successfully integrated in headphones as well.

Every person experiences sound differently and has their own individual listening preferences — which also depend on age and hearing ability. Therefore, factory settings for audio solutions cannot equally appeal to all listeners. The usual adjustment options also have limitations. The Oldenburg Branch HSA of Fraunhofer IDMT has developed a method and algorithms to enable a simple and intuitive adjustment of sound preferences without complex and rigid equalizers. On an intuitive user interface, users select their favorite sound along the instrumentation of a demo song in a playful manner. In just a few steps, a virtual assistant inquires about sound preferences for normal and quiet sound volumes of different instruments. Once set, the sound profile has a positive effect on the overall sound. This technology can be integrated in devices with sound reproduction such as TVs, smart phones, soundbars or infotainment systems in cars as well as on streaming or media platforms.

More than technically perfect sound

In developing sound personalization, Fraunhofer researchers have paid special attention to a user-friendly application of the technology. “Each person has a personal sound preference. The usual sound adjustment options do not take into account how individual loudness perception affects these preferences — or users are discouraged by the complexity of the options and do not use them. Our technology reduces these obstacles because it can be used without knowledge of levels and frequencies and aims to create the individually best sound for every audio volume,” notes Dr. Jan RENNIES-HOCHMUTH, Head of Personalized Hearing Systems at Fraunhofer IDMT.

“We are happy to have implemented this technology, which we call YourSound, in the headphone product category, thereby making it available to a wider community of users. In the past, we were able to successfully adapt this technological concept for fast and individual sound adjustment to multimedia systems in cars,” summarizes Dr.

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Jens-E. Appell, Head of Department, Oldenburg Branch for Hearing, Speech and Audio Technology HSA.

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The technology for personalizing sound has been successfully implemented in Sennheiser consumer headphones together with Sonova Holding AG.

Further information on technologies for individual sound quality and good speech intelligibility at Fraunhofer IDMT in Oldenburg can be found at https://www.idmt.fraunhofer.de/en/hsa/research_fields/personal_hearing_systems.html

Hearing, Speech and Audio Technology HSA at Fraunhofer IDMT in Oldenburg, Germany

Founded in 2008 by Prof. Birger Kollmeier and Dr. Jens-E. Appell, the Branch for Hearing, Speech and Audio Technology HSA of the Fraunhofer Institute for Digital Media Technology IDMT stands for market-oriented research and development with a focus on the following areas: speech and event recognition, sound quality and speech intelligibility, as well as mobile neurotechnology and systems for networked healthcare. With in-house expertise in the development of hardware and software systems for audio system technology and signal enhancement, the employees at the Oldenburg site are responsible for transferring scientific findings into practical, customer-oriented solutions. Through scientific cooperation, the institute is closely linked to the Carl von Ossietzky University, Jade University of Applied Sciences, and the University of Applied Sciences Emden/Leer. Fraunhofer IDMT is a partner in the "Hearing4all" cluster of excellence.

Further information can be found at www.idmt.fraunhofer.de/hsa



Picture 1: The Oldenburg Branch for Hearing, Speech and Audio Technology HSA of the Fraunhofer IDMT has developed adaptive algorithms as well as intuitive methods for adjusting personal sound.

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