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Title:

A process for calibrating HRTFs based on differentiable implicit representations and domain adversarial learning.

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Abstract:

Individualizing Head-Related-Transfer-Functions (HRTFs) can enhance user experience in settings like virtual reality, gaming and spatial music. Normally, individualization approaches are based on the anthropometric measurements of people, either by using a nearest-neighbor approach on a dataset or by regressing those measurements to individualized HRTFs. Those approaches, however, are either too time intensive and/or produce HRTFs sets "as is", not allowing the user to fine-tune the resulting HRTFs. We propose in this paper a process in which a short listening test (of a couple of minutes) can be performed so that a start HRTFs set is calibrated in order to improve the perceived localization accuracy. This is done by optimizing parameters of an implicit HRTF representation with a differentiable loss. Additionally, we show that we can improve learned HRTFs representation by leveraging a domain adversarial loss during training. We present results in simulated participants, showing that the method works in theory and provides equivalent results as an optimal nearest-neighboring approach on a large (1000+ HRTFs) dataset.