1 Topic Description

Topic:

Individual Head-related transfer functions (HRTFs) are one key element for achieving natural spatial audio rendering via headphone. It is possible to obtain individual HRTF from the shape of a person's head and ears.

The objective of this task is to develop method to synthesize/reconstruct HRTFs based on pictures of the person's ears.

Provided input:

A dataset of 2D pinna images and corresponding individual HRTFs from SONICOM are provided as default option [Ref 1]:

- HRTFs are in SOFA format
- HRTFs are all minimum-phase, as ITD is not considered in this contest
- For each subject, , a collection of 2D pictures of left/right pinnae from different views is provided
- Additional datasets can also be used for training

Expected output:

- A model which takes a set of 2D pinna images as input and reproduces the HRTFs (same format as the HRTF in the dataset provided) of the person as output.
- The source code of the algorithm as well as a report describing the used acquisition method and results.

Evaluation:

The performance on this task is evaluated objectively according to Critical-Band Mean Squared Error (CB) [Ref 2]:

$$\mathrm{MSE}_{\mathrm{CB}} = \frac{1}{n\mathrm{Bins}} \cdot \sum_{i=1}^{n\mathrm{Bins}} \left(\alpha_{\mathrm{CB}}(i) \cdot \left[|\mathrm{HRTF}_1(i)| - |\mathrm{HRTF}_2(i)|\right]\right)^2,$$

where *nBins=129*. Participants can define train/validation split. Final ranking will be obtained using a hidden test set.

[Ref 1].: I. Engel, R. Daugintis, T. Vicente, A. O. T. Hogg, J. Pauwels, A. J. Tournier and L. Picinali; The SONICOM HRTF Dataset, in J. Audio Eng. Soc., vol. 71, no. 5, pp. 241–253, 2023.

[Ref 2].: R. Nicol, V. Lemaire, A. Bondu, S. Busson; Looking for a relevant similarity criterion for HRTF clustering: A comparative study, in 120th Audio Engineering Society Convention, Paris.