Poster AP-10

Archetypal analysis of auditory profiling data towards a clinical test battery

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Nowadays, the pure-tone audiogram is the main tool used to characterize the degree of hearing loss and for hearing-aid fitting. However, the perceptual consequences of hearing loss are typically associated not only to a loss of sensitivity, but also to a loss of clarity (distortions) that is not captured by the audiogram. Here, we hypothesize that any listener's hearing can be characterized along two dimensions: audibility-related and non-audibility-related distortions. In this space, four profiles can be identified: normal-hearing, sensitivity loss, hearing loss with clarity loss and normal-hearing with clarity loss (hidden hearing loss). Recently, Thorup et al. (2016) proposed an extended auditory profile beyond the audiogram for hearing aid candidates. A new analysis of these data using archetypal analysis is presented here to evaluate our hypothesis. This technique uses unsupervised learning for identifying extreme patterns in the data, which would correspond to different profiles. Results provided consistent evidence of the existence of different "Auditory Profiles" in the data. The most sensitive tests for the classification of the hearing-impaired listeners were related to temporal processing, loudness, cognition, and speech perception. The current approach seems promising for analyzing other existing data sets in order to select the most relevant tests for auditory profiling.