Forum Acusticum 2026

8-12 September 2026

Place:

Graz, Austria

Title:

Psychoacoustic-based acoustic analysis recommendation based on the symbiose of domain knowledge and AI models.

Authors:

Lobato, Thiago; Herweg, Andreas; Kamper-Schley,Tim

Abstract:

Loudness, sharpness, tonality, roughness, fluctuation strength, relative approach, Fast Fourier Transform, modulation spectrum (and many others...). The number of acoustic analyses can be daunting for inexperienced users. One consequence of this is that even when there may be a perfect match between an industrial problem and an acoustic solution, this link can be obfuscated by the lack of user expertise. We propose a new solution paradigm for this problem: we train an AI model able to perceive the prominent psychoacoustic characteristics of sounds and combine it with domain knowledge for improved analysis parameterization. This allows us to tailor analysis recommendations based on the symbiosis of how the sound is perceived by people together with expert domain knowledge. This is achieved by a psychoacoustic-based network pre-training coupled with a fine-tuning step using expert-generated listening test results on strongly diverse industrial sounds. The results of the model are then piped into a rule-based model extracted from expert knowledge. We show that the model can achieve good results in predicting expert ratings and can produce helpful recommendations. This is a first step in the direction of fully automated acoustic analysis recommendations, which we believe can empower a whole class of non-expert users.

HEAD acoustics GmbH
Ebertstraße 30a
52134 Herzogenrath, Germany

Andreas Herweg
Mail: info@head-acoustics.com
Telephone: +49 2407 577-0