

Identification and Classification of Noise Patterns

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Sound quality evaluation is a challenge due to spectral and temporal structures of noise. Tonal components, howling sounds and modulated signals are often the cause of customer complaints. Thus, besides frequency-weighted level like dB(A) or loudness, additional parameters are required.

Besides time-varying loudness, other psychoacoustic parameters like sharpness and roughness can be used for sound quality evaluation. Sharpness considers the amount of high frequency components of a noise, and roughness evaluates modulation characteristics. In addition, a metric combining modulation spectral analysis with loudness calculation has been introduced.

Some years ago, a “Hearing Model” was developed with the intention of explaining and describing psychoacoustic effects. Applying the Hearing Model to sound quality tasks allows evaluating the spectral and temporal patterns of a sound (“Relative Approach” analysis) where absolute level or loudness is often without significance. The Relative Approach analysis emphasizes all relevant signal components concerning human auditory perception: tonal and transient signals. For extracting and evaluating individual patterns further signal-processing steps are necessary.

The paper presents different methods for effective sound quality evaluation of noise and their application to several examples.

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