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Contextual event-based sound quality metrics

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Abstract:

Sound quality metrics are often used to analyze complex sound scenarios, such as soundscape applications. Sound quality can also affect the health and well-being of people in a given environment. Therefore, it is of the utmost importance that the definition of good sound quality in a particular context is as precise as possible. In this aspect, psychoacoustic indicators such as maximum, average, or percentile values of psychoacoustic parameters are usually used in a linear combination to create a metric based on listening test results. However, this linear approach may disregard many complex nonlinear parameter dependencies that could be helpful for a better description of human perception. Instead of using summary statistics, the importance to perception of individual events in terms of their duration, magnitude, and frequency should be considered. For example, individual tonal events of a certain duration may have a strong influence on the perceived quality, even with low average tonality and percentile values. And the low-frequency tonal content of music may be perceived as an important aspect of a high-quality sound event, whereas the same amount of low-frequency tonality would be not accepted for a technical sound. Interview evidence from people immersed in various soundscapes appears to indicate significant "contextual weightings" involving both time and frequency, which might be applied to or evolved from current psychoacoustic metrics according to contextual classes. In this paper we provide an overview and some practical guidance for developing contextual event-based sound quality metrics.