GUEST EDITORS' NOTE
Special Issue on Spatial Audio

Spatial audio represents a fast-growing research area, which includes a number of different actors, including universities, research centers, and industries. Spatial audio involves several applications, ranging from very different fields like architectural acoustics, automotive, hearing research, gaming, virtual/augmented reality, immersive audio, and entertainment but also very different applied research in areas like teleconferencing, navigation guidance, and drone localization for military purposes.

The playback of spatial audio started from stereo audio systems and binaural headphones before the 1970s and soon moved to head-tracked (individualized/personalized) binaural rendering using special visual devices. Spatial (or three-dimensional) audio has also become an essential component for mobile phones and devices as well as for playback listening rooms. Several methods for playback, starting from binaural or stereo-dipole rendering to high-order ambisonics or wave-field synthesis, have been implemented also in home audio or automotive applications, increasing the research interest among car manufacturers or loudspeaker industries.

The outcomes reported in the following articles underline the new achievements obtained in the signal processing technologies applied on three dimensional audio, resulting in a more immersive and inclusive sound playback. These new achievements are applied both in the measuring and playback applications.

In this Special Issue, five articles reported on new methods and theories dealing with specific aspects to spatial audio. Detailed descriptions on these papers are summarized in the following.

The first paper, "Context-Based Evaluation of the Opus Audio Codec for Spatial Audio Content in Virtual Reality" by Ben Lee et al., investigates the effect of Opus compression on the basic audio quality of Ambisonic audio in different virtual-reality contexts such as gaming, music, soundscapes, and teleconferencing. The second paper, "A Magnitude-Based Parametric Model Predicting the Audibility of HRTF variation" by Shaimaa Doma et al., proposes a parametric model to analyze unilateral differences in head-related transfer functions (HRTFs). Seven magnitude-based distance metrices have been used to analyze the common trends in inter-individual and intra-individual HRTF differences.

The third paper is "Weighted Pressure and Mode Matching for Sound Field Reproduction: Theoretical and Experimental Comparisons" by Shoichi Koyama et al. This paper, theoretically and experimentally, compares two sound field reproduction methods, weighted pressure matching and weighted mode matching, which are derived by introducing weighting matrices to existing pressure-matching and mode-matching methods. It also shows that the weighted pressure matching is a special case of the weighted mode matching. The fourth paper, "Computationally-Efficient Simulation of Late Reverberation for Inhomogeneous Boundary Conditions and Coupled Rooms" by Christoph Kirsch et al., introduces an efficient method to simulate late reverberation. This simplification is achieved by generating a limited number of incoherent signals with frequency-dependent exponential decay radiated by spatially distributed virtual reverb sources. The paper demonstrates the validity of the approach by a technical evaluation and listening tests in comparison to measurements in real rooms. The final paper, "Comparison of Transaural Configurations Inside Usual Rooms" by Adrien Vidal et al., considers the design of transaural systems in rooms, which influences spatial sound reproduction.

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