GUEST EDITORS' NOTE
Special Issue on Audio for Virtual and Augmented Reality

Part II: Applications

The AVAR conference that took place in August 2022 in Redmond presented several theoretical discussions and potential applications of audio in virtual reality (VR) and augmented reality (AR). Although the first part of the JAES special issue focused mostly on the theoretical aspects, in this issue, we examine the potential applications in which audio plays and important role in VR, AR, and extended reality (XR).

PAPERS

In the following, the papers from the special issue are briefly summarized. "Evaluation of Metaverse Music Performance With BBC Maida Vale Recording Studios," by Cairns and co-authors, details a case study evaluation of a recording experience in a networked XR simulation.

"Auralization of Measured Room Transitions in Virtual Reality," by McKenzie et al., proposes a baseline interpolation method for higher-order Ambisonic spatial room impulse responses. The method is evaluated in VR. In the given scenario, it is shown how a 50 cm–1 m inter-measurement distance is perceptually sufficient.

In "Multi-Layered Architecture for Efficient and Accurate HRTF Rendering," Marchan and Allen propose a novel efficient binaural renderer. When tested against an HRTF database, subjects had difficulties distinguishing between the efficient simulation and the corresponding HRTF.

In "Spatial Integration of Dynamic Auditory Feedback in Electric Vehicle Interior," by Dupré and co-authors, the acoustical and perceptual spatial characteristics of the car soundscape are analyzed. It is shows that the spatial attributes of sound sources are fundamental to improve the perceptual coherency of the global environment.

In the paper, "The Sonic Interactions in Virtual Environments (SIVE) Toolkit," the authors present an open-source toolkit to simulate musical instruments using finite difference time domain physical models. The toolkit uses Unity3D for the 3D simulation and Juce as the sound engine. In "Virtual-Reality–Based Research in Hearing Science: A Platforming Approach," by Lundby Pedersen and colleagues, the Oticon Medical Virtual Reality experiment platform is demonstrated. The platform fast-tracks the creation of hearing research experiment templates to be used to explore ecological ways of performing listening tests. The authors are discussing options to open source the platform.

In "Measuring Motion-to-Sound Latency in Virtual Acoustic Rendering Systems," Meyer-Kahlen et al. propose two methods for latency measurements using either impulsive or periodic movements. The method is tested on a high-quality tracking system, where it shows to be reliable, and on an inertial measurement unity system, where it is difficult to define the latency.

CONCLUSIONS

The papers presented in this special issue show how spatial sound, binaural rendering, and HRTFs are still an active field of research. Overall, the special issue shows the diverse set of research issues faced when creating immersive auditory environments, from designing new standards to the problem of creating efficient but high-fidelity simulations.

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