

Subjective Performance Criteria for Mixed-Reality Immersive Audio

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ABSTRACT

An overall design objective of virtual, augmented or mixed-reality audio systems is to maximize the plausibility of an artificial experience presented to a user via earphones or a head-mounted audio-visual display apparatus. A number of metrics have been proposed for evaluating the subjective performance of spatial audio rendering techniques in a variety of playback environments. They include, for instance, positional audio rendering accuracy measures relevant for quantitatively evaluating the subjective performance of virtual reality (VR) audio systems. The design objective of VR systems amounts to *suspension of disbelief*, because the user is aware that every aspect of the experience is computer generated and presented via a display system that occludes and replaces the real world. Augmented or mixed reality (AR/MR) audio systems, on the contrary, aim to display digital objects overlaid in the world perceived naturally by the listener. A challenge of AR/MR applications is therefore to *prevent dissonance* between the perception of computer-generated objects and the listener's expectations (for instance, avoid artifacts that might reveal that some of the perceived objects are artificial). We propose a subjective-assessment rubric that we have begun employing in our AR/MR audio system performance surveys, centered initially on loudness and positional audio rendering.

Keywords: Subjective, Performance, Virtual, Augmented, Reality

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