



SonoHaptics

An Audio-Haptic Cursor for Gaze-based Object Selection in XR

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ACM UIST 2024

We present a computational approach to generate **audio-haptic feedback** for accurate gaze-based object selection, even in cluttered and occluded environments with small objects, without relying on visual feedback.

Our perception study shows that people associate **lighter object color to higher audio pitch** and **larger size to stronger vibration amplitude**, exhibiting cross-modal correspondences.



SonoHaptics automatically generates distinct audio-haptic feedback for each object in a scene. We developed **regression models** to map lightness to audio pitch and size to vibration amplitude. We also use **directional audio** and **material-based timbre** for naturalistic mappings.

SonoHaptics provides **local amplification** to emphasize differences between nearby objects, improving selection accuracy for small objects compared to no feedback or static feedback. It showed no statistically significant difference from text-to-speech in accuracy and selection time, while significantly reducing selection time for highly similar objects.