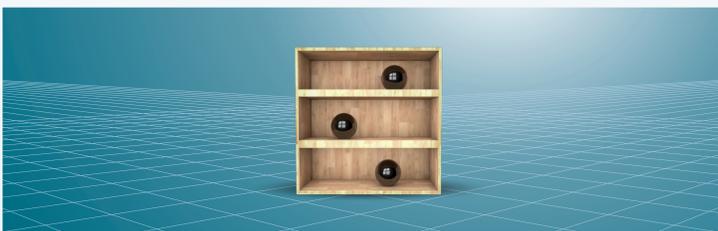# Soundspace:
Toward Accessible Spatial Navigation and Collaboration for Blind Users

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Blind users are excluded from VR even though spatial sound interfaces have shown to be effective [4] at enhancing and expanding spatial navigation [7], which in today's virtual worlds relies heavily on visual cues.

Navigating 3D space for the blind: **Auditory guidance**

SoundSpace uses spatialised directional cues for wayfinding. The virtual environment uses spatialized directional cues and instructions so users can still hear needed environmental sounds [2]
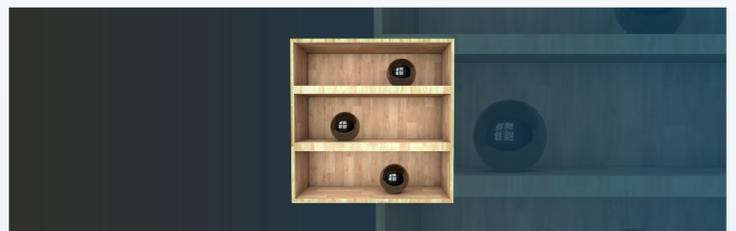
Navigating 3D interaction spaces **with tonal cues**

SoundSpace extends visual navigation to sound. Blind users can more efficiently navigate with virtual sound displays than with non virtual displays [4-5]. The SoundSpace bookshelf offers low, medium and high tones to indicate priority and depth. This can indicate time passage as well (past-present-future) in information storage and retrieval contexts of use.
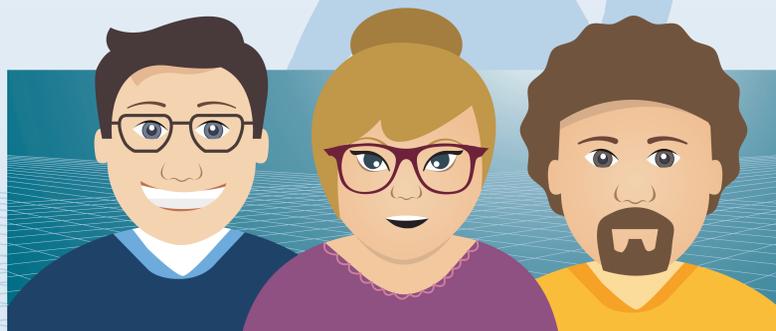
Navigating collaborative encounters using spatially sensitive privacy

Social encounters can be navigated to (the space where more than one user is gathering) and sensed with sound cues. Another users presence is detected and the opportunity to interact is afforded by fixating and intensifying sound cues (contact), indicating permission to talk.

In summary, spatialised auditory navigation interaction design techniques can be used to help blind users navigate and participate in immersive VR environments for general purpose wayfinding, interacting with information displays or collaboration tasks using sonification.

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