

Computational Model of Spatial Auditory Attention in ACT-R

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Abstract

We present an extension to the ACT-R audition module developed to support models of spatial auditory attention. This extension adds support for spatial sounds and models a gradient of spatial auditory attention over 180 in the frontal horizontal plane. This spatial gradient represents the attentional bias created from interaction between top-down (goal driven) attention and bottom-up (salient) attention, represented by a Gaussian and inverse Gaussian curve respectively. Response time to a sound is modeled using a calculated attentional bias, affected by the current goal location and the sound location. This ACT-R extension is used to model a behavioral task where subjects were told to attend to a spatial location and respond to sounds at attended and distractor locations. By incorporating this model into ACT-R, we will gain insights into the interaction between spatial auditory attention and other other cognitive processes, such as learning and memory.