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Modeling the role of salience in the allocation of overt visual attention

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Abstract

A biologically motivated computational model of bottom-up visual selective attention was used to examine the degree to which stimulus salience guides the allocation of attention. Human eye movements were recorded while participants viewed a series of digitized images of complex natural and artificial scenes. Stimulus dependence of attention, as measured by the correlation between computed stimulus salience and fixation locations, was found to be significantly greater than that expected by chance alone and furthermore was greatest for eye movements that immediately follow stimulus onset. The ability to guide attention of three modeled stimulus features (color, intensity and orientation) was examined and found to vary with image type. Additionally, the effect of the drop in visual sensitivity as a function of eccentricity on stimulus salience was examined, modeled, and shown to be an important determiner of

attentional allocation. Overall, the results indicate that stimulus-driven, bottom-up mechanisms contribute significantly to attentional guidance under natural viewing conditions.

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Keywords

Eye movements; Natural images; Visual attention; Computational model; Salience

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