

Directing Attention in Virtual Environments

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The ability to manipulate viewpoint to the appropriate position requires that the viewer have both a good understanding of the interface and the environment. One paradoxical finding is that while self-control is critical to learning about a VE viewers in an information-rich VE are particularly susceptible to superfluous data and easily distracted.

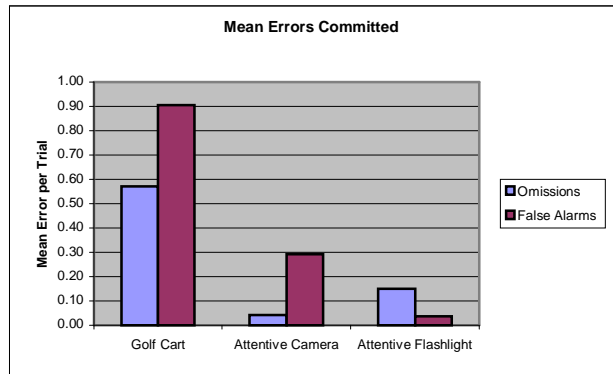
Constrained Navigation is a method for reconciling the issues surrounding self-control by allowing the viewer to explore freely while allowing the system to *suggest* optimal locations and orientations. In this study, we examine the effectiveness of two constrained navigation interfaces. The first technique, called the *Attentive Camera*, is characterized by the system continuously aligning the viewpoint with the ideal gaze vector as the viewer moves through the environment. In the second technique known as the *Attentive Flashlight*, the ideal gaze vector is used to compute the direction in which to shine a spotlight. As the viewer moves the environment, the flashlight fixates on objects of interest. A study was conducted with 24 paid participants to assess the information gathering ability of the navigation techniques.

Conventional *Golf-Cart* navigation in which gaze is aligned with the motion vector was included as a control. Participants completed four search tasks in a virtual art gallery. The attentive flashlight was superior on all measures including errors, time, and effort. Golf cart users were the poorest on all measures with attentive camera users falling in between.

This study is part of ongoing research in directing attention intended to assist humans in information-overloaded environments without filtering out potentially important data. Papers describing these attention direction techniques and further experiments can be found at: www2.sis.pitt.edu/~shughes/Publications.html. Related research is described at :www-2.cs.cmu.edu/~soft-agents/project_grants_afosr.html.

Reference

Hughes, S. & M. Lewis (2002). Attentive Interaction Techniques for Searching Virtual Environments. *Proceedings of the Human Factors and Ergonomics Society's 46th Annual Meeting*, Baltimore MD.



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