Pointing Postures in 3D Large Displays

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1. Background

Although many object pointing and selecting techniques for large screens have been proposed in the literature for several years (Banerjee et al., 2012; Jota et al., 2010; Park et al., 2012; Vogel and Balakrishnan, 2005), there is a lack of quantitative evidence suggesting proper pointing postures for interacting with stereoscopic targets in immersive virtual environments. The objective of this study was to explore users’ performances and experiences of using different postures while interacting with 3D targets remotely in an immersive stereoscopic environment.

2. Method

Two postures, hand-directed and gaze-directed pointing methods, were compared in order to investigate the postural influences. Two stereo parallaxes, negative and positive parallaxes, were compared for exploring how target depth variances would impact users’ performances and experiences. Fifteen participants were recruited to perform two interactive tasks, tapping and tracking tasks, to simulate interaction behaviours in the stereoscopic environment.

3. Results

Hand-directed pointing is suggested for both tapping and tracking tasks due to its significantly better overall performance, less muscle fatigue, and better usability. However, a gaze-directed posture is probably a better alternative than hand-directed pointing for tasks with high accuracy requirements in home-in phases. Additionally, it is easier for users to interact with targets with negative parallax than with targets with positive parallax.

4. Conclusions

This research provides an investigation of the effects of postural differences on user performance and experiences of interacting within a stereoscopic environment. Based on the findings of this research, future applications involving different pointing techniques should consider both pointing performances and postural effects as a result of pointing task precision requirements and potential postural fatigue.

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References


