EVALUATING 3D MODELLING USER INTERFACES

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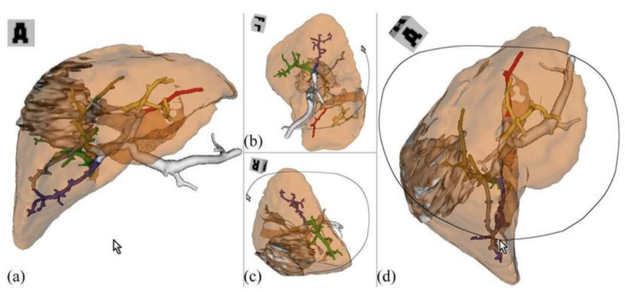
Introduction

3D User Interfaces (3DUI) are involved in important applications in 3D computer graphics and visualisation, like animated movies, games and medical scans.

Objectives

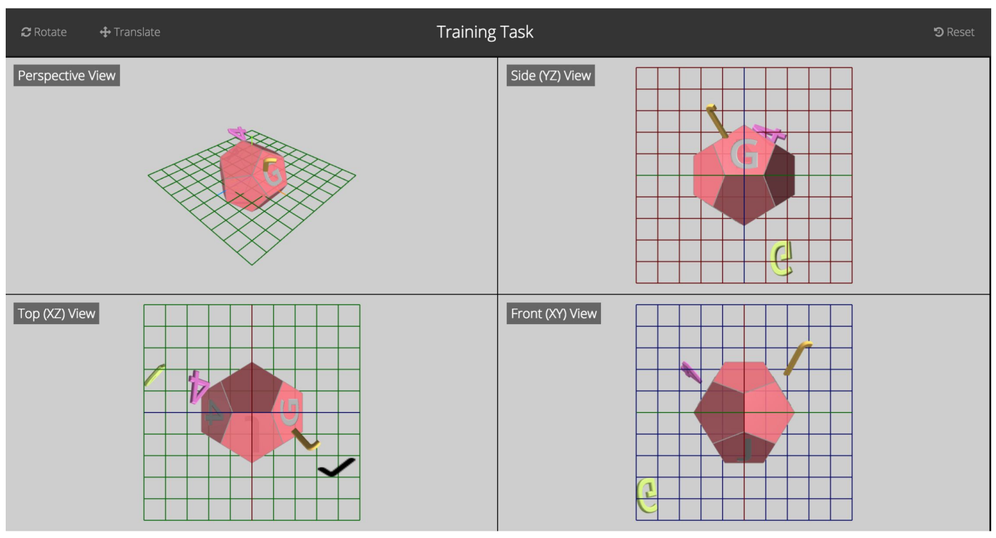
We aim to determine whether: Interactive Shadows performs better than traditional multi-view 3DUIs; one of the methods of rotation tested is better suited to certain class of tasks than the others.



Rotation controller is used to rotate a liver with tumor. Source: Bade, Ragnar, Felix Ritter, and Bernhard Preim. "Usability comparison of mouse-based interaction techniques for predictable 3d rotation." Smart graphics. Springer Berlin Heidelberg, 2005.

Method

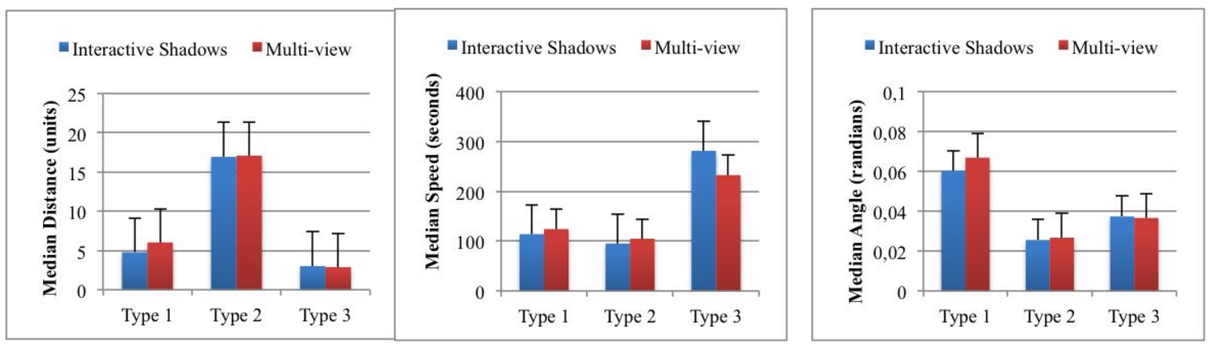
We performed two experiments. We tested Interactive Shadows against a traditional 3DUI with three orthographic views with three different tasks. We also tested the three most prevalent controllers (Arcball, Two Axis Valuator, and Discrete Sliders) with the two types of tasks of differing difficulty.

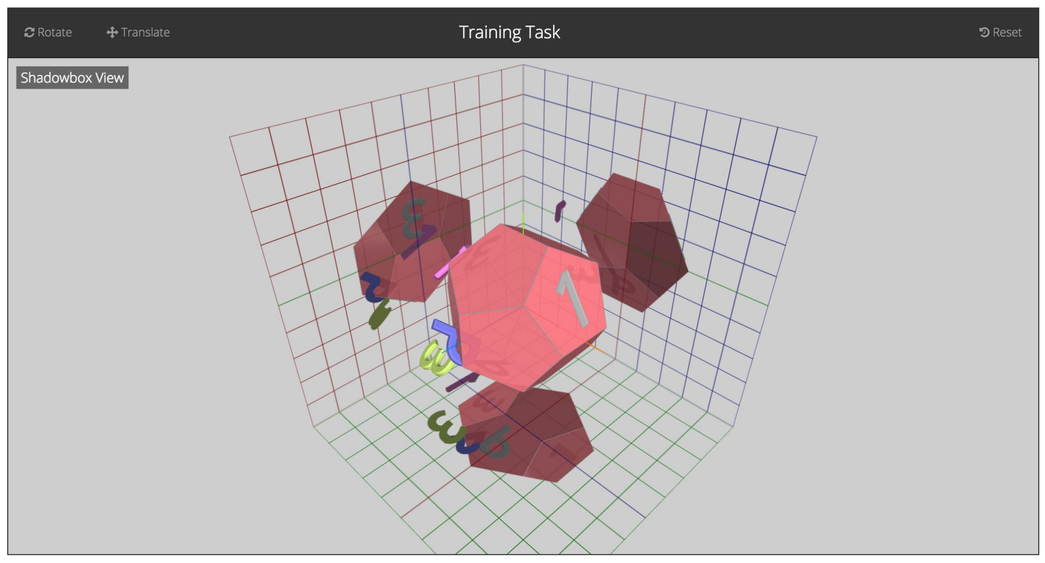


Traditional multi-view 3DUI designed to compare against Interactive Shadows

Interactive Shadows Evaluation Findings

Interactive shadows were found to be significantly better in terms of distance accuracy for a task involving distance estimations. This suggests that the interactive shadows interface might help users approximate relative object positioning.

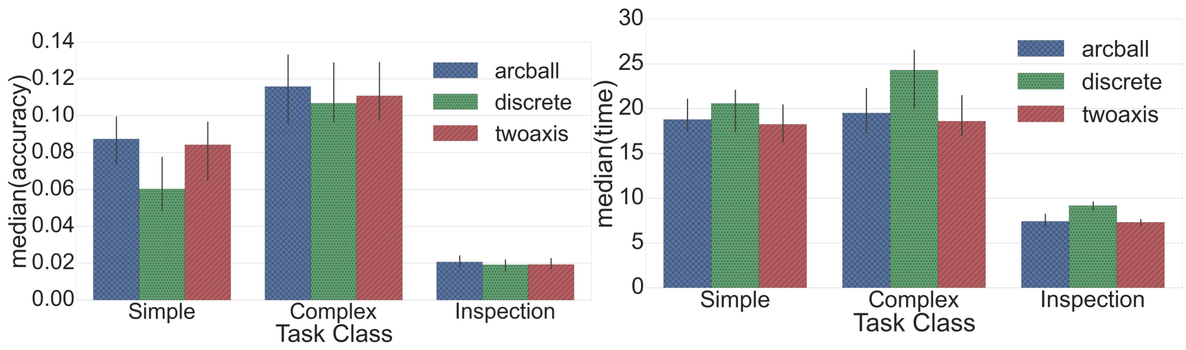


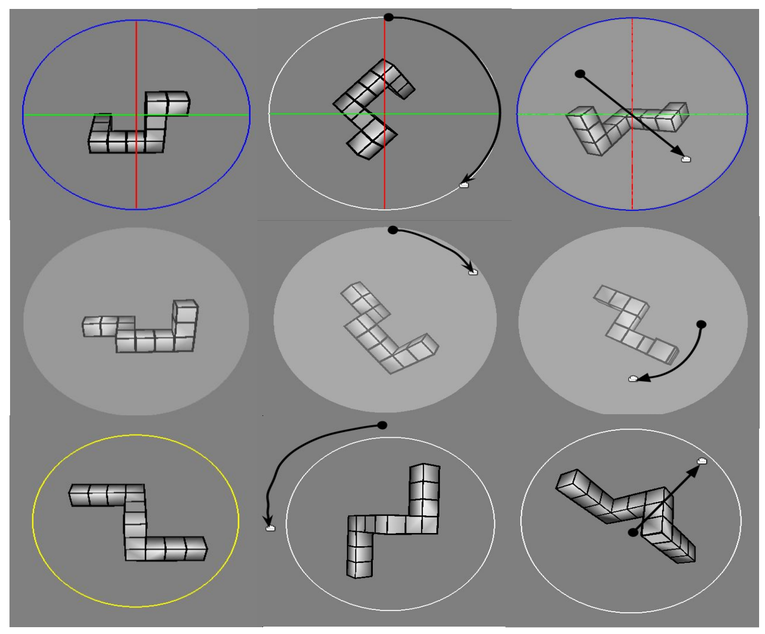


Appearance of the Interactive Shadows controller

Rotation Evaluation Findings

We found the Discrete Sliders to be more accurate for simple matching tasks but slower for complex matching, and inspection tasks. This suggests that Discrete Sliders are most appropriate in situations where fine-grained accuracy is valued over speed, while for other tasks, the other two controllers are better suited.





Appearance & interaction design for the rotation controllers. From top to bottom: Discrete Sliders, Arcball and Two Axis Valuator.

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