Reality-Based Animation Interfaces

1. Aims

- Develop two alternative interfaces tailored for low-fidelity animation (fig 1).
- Confirm accessibility of virtual reality (VR) interface for untrained users
- Benchmark usability and explore usage barriers for tangible interface

![Fig. 1: A single frame from Big Buck Bunny (2008) as it appears in each stage of the animation pipeline. From left to right: storyboard sketch, lo-fi animation and final production frame.](image1)

2. Implementations

- Both interfaces were developed through an iterative process of prototyping and expert interview

**Realized via a fully-occluding VR headset (Oculus Rift DK2).**
Users select objects via head-tracking and control the system with a gamepad.

**Uses a depth sensor (Kinect for Xbox One) to detect the user's arrangement of 3D-printed camera and characters, and converts it to a virtual 3D scene.**

![Fig. 2.1: Colleague poses with Oculus and gamepad setup.](image2.1)

![Fig. 2.2: Tangible system in use.](image2.2)

3. Methods

- Three heuristic experts engaged in free exploration of the system. Qualitative evaluation was performed through think-aloud assessment, open ended questions and filling out the system usability scale (SUS).
- 20 animation professionals created 3D scenes from a storyboard (fig. 2.2).
  They then completed the SUS followed by a diagnostic questionnaire and interview.

4. Results

- Object selection by head-tracking and translation via the gamepad were identified as easiest aspects of the interface.
- However, evaluators expected camera control via both gamepad and headset.

![Fig. 4.1: System was benchmarked at SUS score of 78.0, placing it in the category "good", and at the 82nd percentile of all systems surveyed in Sauro [2011].](image4.1)

![Fig. 4.2: Those with less 3D experience reliably preferred a tangible interface. Experienced users cited model inflexibility and lack of fine-grained control as barriers.](image4.2)

5. Conclusions

- VR allows users to better understand 3D spatial relationships. This shows promise for previz applications once usability issues are resolved.
- Tangible interfaces are highly usable, especially for those with little 3D experience. However, more flexible models and finer-grained control are required for mainstream industry adoption.

References: Jeff Sauro. 2011. A practical guide to the system usability scale. Big Buck Bunny assets (C) copyright 2008 Blender Foundation / www.bigbuckbunny.org and shared under CC-BY 3.0 https://creativecommons.org/licenses/by/3.0/