Contribution & Benefit Statement

An exploration of the design space for using motion trajectories to edit visual elements across space and time. Pen-based techniques are introduced in DirectPaint: a video painting and annotation system.

Summary of Changes:

1. Highlight Contribution

In the Background section we added text at the end of Temporal editing of Graphical Objects to indicate how the focus of our work compares to the work discussed in this area. In particular, we note how it differs from the new references we added on trajectory-defining animation systems.

Also within the Background section, we added a paragraph concluding Video Navigation and Interaction to emphasize that we address the control of time for visual content, as opposed to applying automatic propagation as other systems do.

2. Design Space Rationale

We changed wording in parts of the Design Space section to provide more structure in describing our approach.

3. Stationary Objects

In the Discussion section we expanded on the description of limitations in the second paragraph to bring the issue of stationary and ambiguous trajectories to attention. We cited Karrer et al's work in relation to this.

4. Added references

We added the following references. Other than Karrer et al, which is discussed with the issue of stationary objects, all new references were discussed in the Background section.

Baecker, R. Picture-driven animation. AFIPS 1969 (Spring), ACM Press (1969), 273-288.

Davis, R. C., Colwell, B., and Landay, J. K-sketch: a ‘kinetic’ sketch pad for novice animators. CHI 2008, ACM Press (2008), 413-422.

Karrer, T., Wittenhagen, M., and Borchers, J. DragLocks: handling temporal ambiguities in direct manipulation video navigation. CHI 2012, ACM Press (2012), 623-626.

Kimber, D., Dunnigan, T., Girgensohn, A., Shipman, F., Turner, T., and Yang, T. Trailblazing: Video playback control by direct object manipulation. IEEE ICME 2007, (2007), 1015-1018.

Li, Y., Hinckley, K., Guan, Z., and Landay, J., Experimental Analysis of Mode Switching Techniques in Pen-based User Interfaces, CHI 2005, ACM Press (2005), 461-470.

Ramos, G., Boulos, M., and Balakrishnan, R., Pressure Widgets. CHI 2004, ACM Press (2004), 487-494.

Walther-Franks, B., Herrlich, M., Karrer, T., Wittenhagen, M., Schröder-Kroll, R., Malaka, R., and Borchers, J. Dragimation: direct manipulation keyframe timing for performance-based animation. GI 2012, ACM Press (2012) 101–108.

5. Clarifications and fixes

- Some wording changed in pressure-based trace technique description to improve description.

- Fixed an error in the count of participants with digital drawing experience

- A few other changes to address grammar and style