Figure 1: Tracking a 40x40 projective region across a 74 frame, 320x240 video sequence.

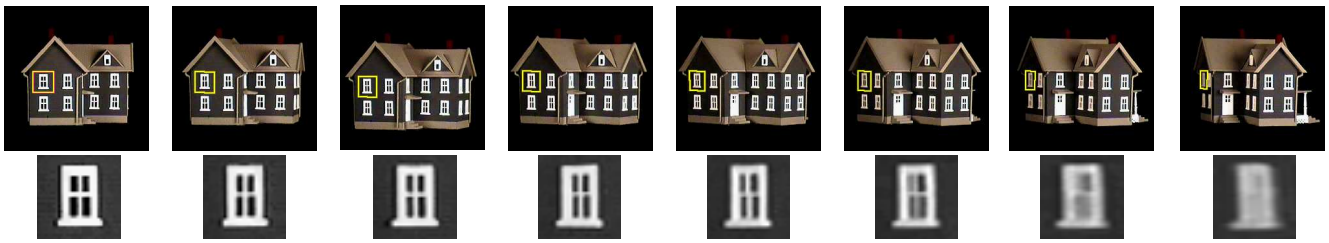

Figure 2: Projective tracking in a QuicktimeVR object movie (a sequence of still images). The bottom row shows the warped region (I_1').

Figure 3: Frames from tracking a curved object using a 48x48 piecewise projective patch with a 3x3 grid.

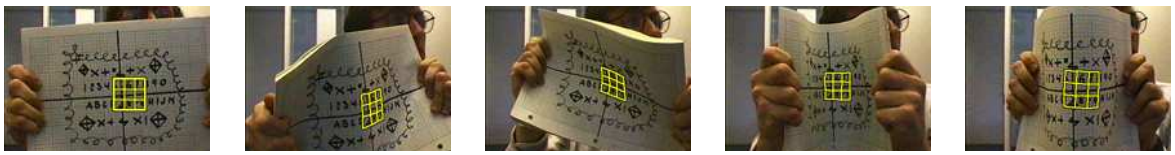

Figure 4: Frames from tracking a flexing object using a 48x48 piecewise projective patch with a 3x3 grid.

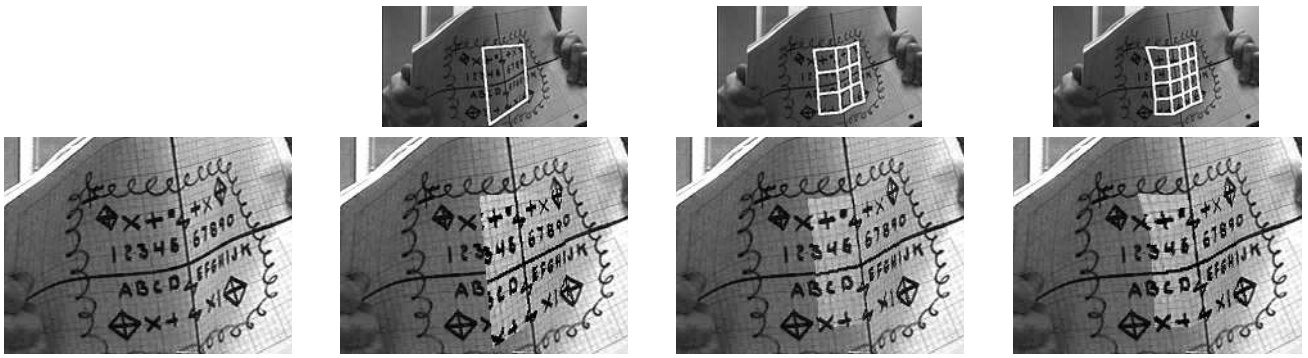

Figure 5: The sequence from Figure 4 is tracked with various 96x96 piecewise-projective patches. The upper row of images shows the trackers. Beneath each, the image is "reconstructed" by drawing the transformation of the patch from the first frame. We do not correct for illumination. The lower left image shows the portion of the original frame shown in the other images.

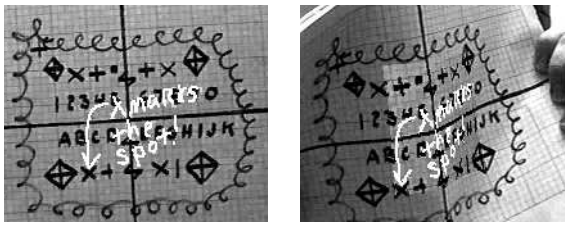

Figure 6: "Virtual Graffiti" - an application of tracking/reconstruction. After performing tracking (Figure 5), we paint on frame 1 of the video and the effects can be propagated to the rest.

Acknowledgements

This research was conducted in the computer graphics group of Apple Computers' Research Laboratories. I would like to thank Yalin Xiong for his assistance with this project including providing me with the QTVR example of Figure 2. Mark Wheeler and Roberto Manduchi, also of the QuicktimeVR group, helped with the preparation of the paper. Gavin Miller, my manager, encouraged this work as well as provided proofreading assistance.