

## **Image-based Walkthroughs of Real-World Environments**

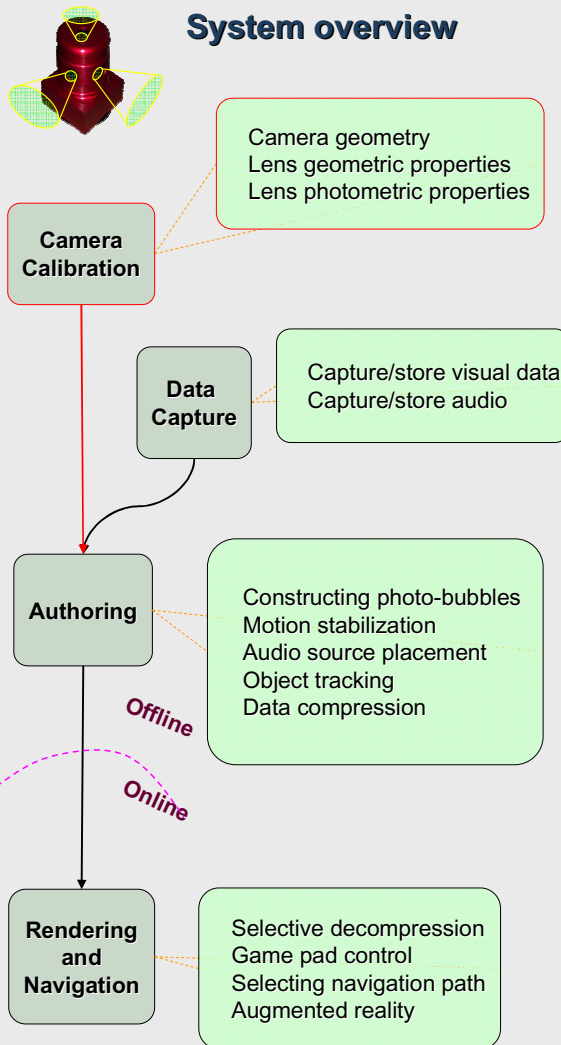
In this demonstration, we will show an image-based rendering system that uses high-resolution omnidirectional video to enable users to explore remote real-world locations. A lightweight high-resolution multi-sensor camera is used to quickly film a tour through a large environment such as a garden or the interior of a house. During the off-line authoring phase, the raw video is processed to produce a stabilized high-quality, high dynamic range video using a combination of novel techniques. These include:

- A stitching algorithm to remove parallax in areas of image overlap,
- Registration and blending algorithms to produce high dynamic range video from alternately exposed video frames,
- Camera stabilization using point features and vanishing lines, and
- A video compression scheme that supports selective run-time decompression and random access.

The final user experience is enhanced with multimedia elements such as overview maps, video textures, pop-up high-resolution stills, and sound. The user controls the viewpoint and location through a standard game controller, and the resulting user experience feels very much like a computer game. The combination of high-resolution continuous imagery with real-time interactivity provides viewers with an unprecedented sense of presence in interesting real-world environments. We will provide a laptop PC on which people can experience the walkthrough themselves.

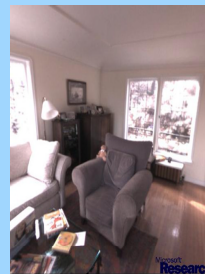
The next page of this proposal is the poster we plan to show at the demo site.

# Image-based Walkthroughs of Real-World Environments

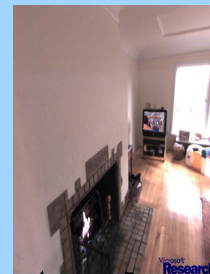


## Snapshots of Interactive Demos

### Home Tour

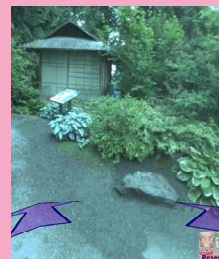


Interactive tour

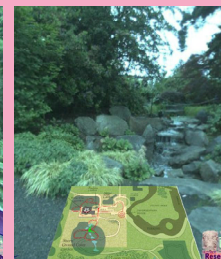


Video-textures

### Bellevue Botanical Garden

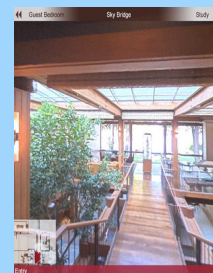


Bifurcations

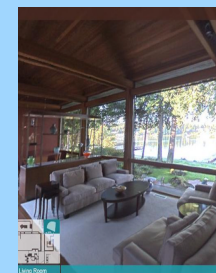


Map control

### High-end Home



Bifurcations



Map control

IMAGE BASED REALITIES