

Panoramic Stereo Video Textures

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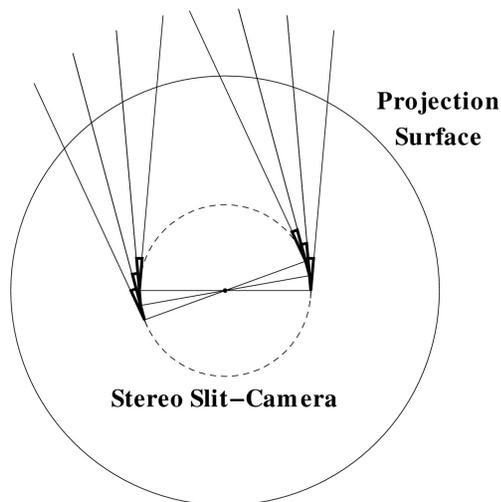
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Panoramic Stereo Imaging

This paper addresses the challenging problem of capturing stereo video over a field of view up to 360 degrees and synthesizing the videos into a stereo panorama.

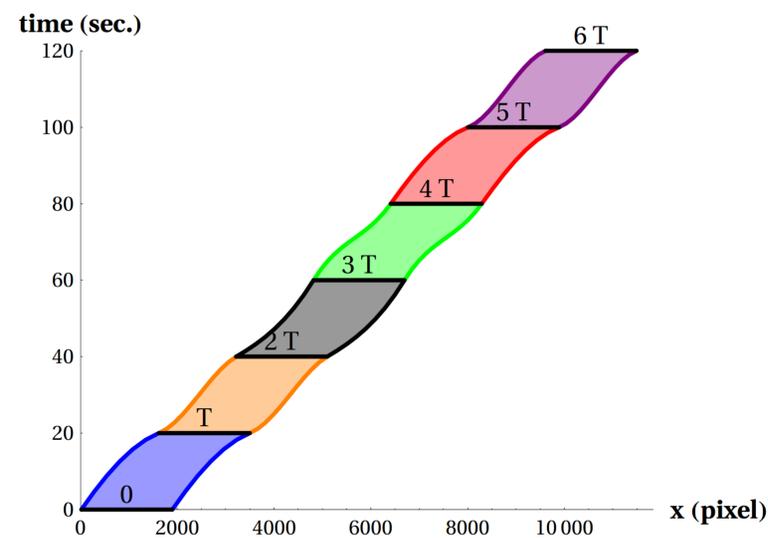
Previous mosaicing methods either capture **static** scenes in stereo or **dynamic** scenes in mono, using small image elements (slits, small blocks).



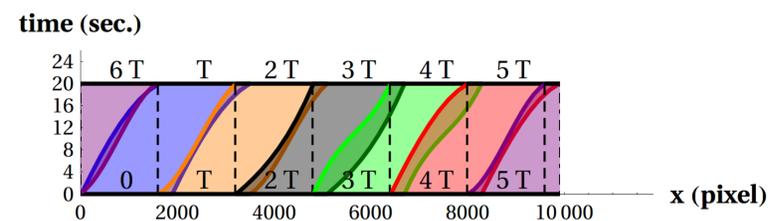
For instance, [Rav-Acha *et al.*, 2007] uses a rotating stereo pair of parallel slit-cameras. For each camera, slits from every frame are stitched together into a mosaic (only three slits are shown above).

Our method: synchronising stereo motion

To reduce the stereo-motion synchronization problem, which occurs near the boundaries of the regions being stitched together, we use full video frames rather than slits or small blocks. Calibration and registration of the full frames lead to left and right XYT volumes, composed of frames shifting over time as the cameras move.

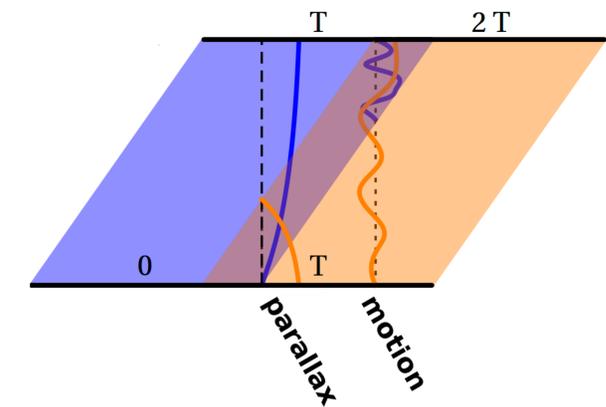


Left and right XYT volumes are treated independently. Each volume is partitioned into blocks of T full frames. The blocks are then blended together to form left and right video textures. These videos are loopable in time.



Blending parallax and motion paths

As the stereo rig rotates, the projection of a fixed point in the scene moves across the image. This image motion is a combination of the motion of the scene point and parallax caused by the camera's small translation component.



Images are blended near the boundaries of two blocks. For an object moving in time (a leaf, for instance), motion and parallax are blended over the overlap between the two blocks. Left and right images are blended independently and then combined for stereo viewing. In our current work, we are examining the detectability of the blending.

References:

Dynamosaicing: Mosaicing of Dynamic Scenes, A. Rav-Acha et al. PAMI 2007.

Panoramic video textures, A. Agarwala et al. ACM Transactions on Graphics, 2005.

