Temporally Coherent Video De-Anaglyph

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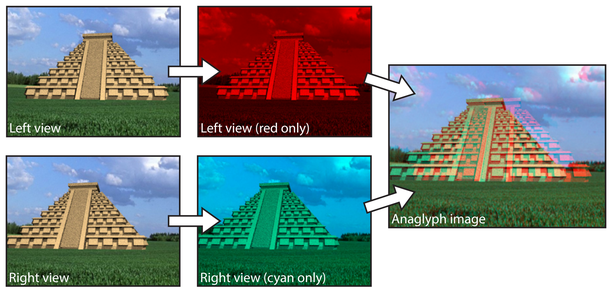
Motivation

Anaglyph 3D images encode the left and right views of stereo 3D images using separate color channels (usually red and cyan):

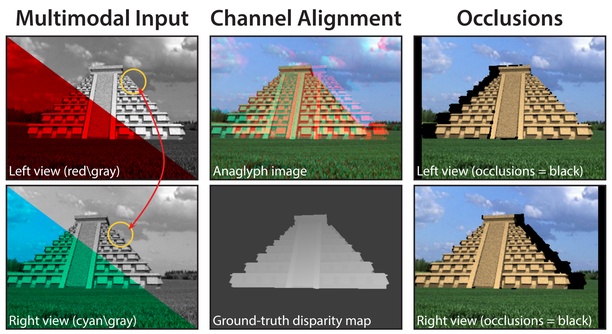


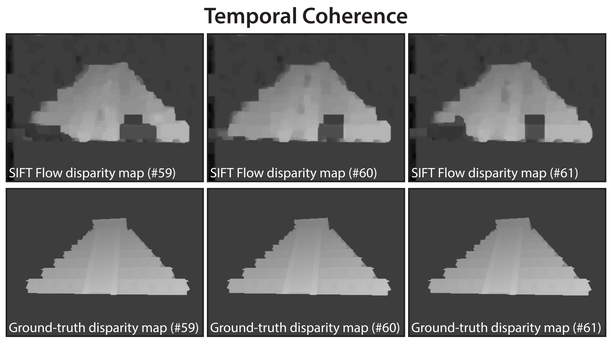
There's a lot of existing anaglyph imagery, for example:

We want to convert existing anaglyph videos to the full-color stereo format used by modern displays and projectors.

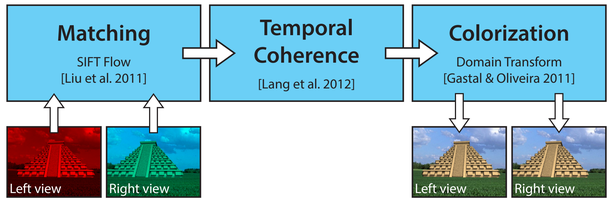
Problem

Video De-Anaglyph is a difficult inverse problem because of the following four challenges:





Our Approach

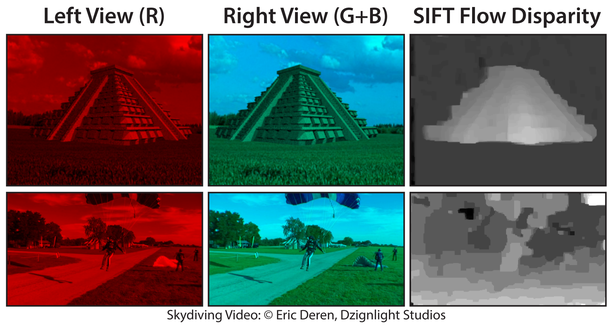


The steps of our pipeline solve the De-Anaglyph challenges:

The Challenge	Our Solution
Multimodal Input	SIFT Flow [Liu et al. 2011]
Channel Alignment	
Occlusions	Domain Transform [Gastal & Oliveira 2011]
Temporal Coherence	Practical Consistency [Lang et al. 2012]

Image Matching

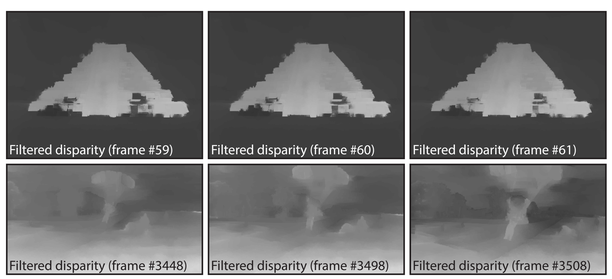
The same scene color may look very different in the left and right anaglyph views. We use SIFT flow [Liu et al. 2011] to robustly match both views despite these inconsistent intensities.



Skydiving Video: © Eric Deren, Dzignlight Studios

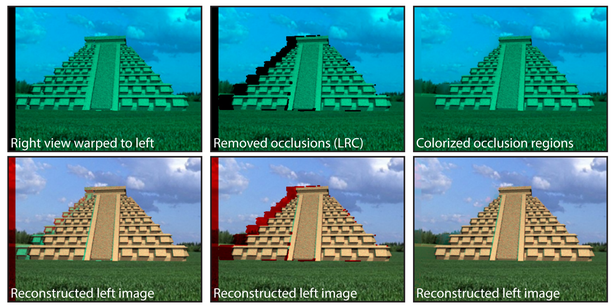
Temporal Coherence

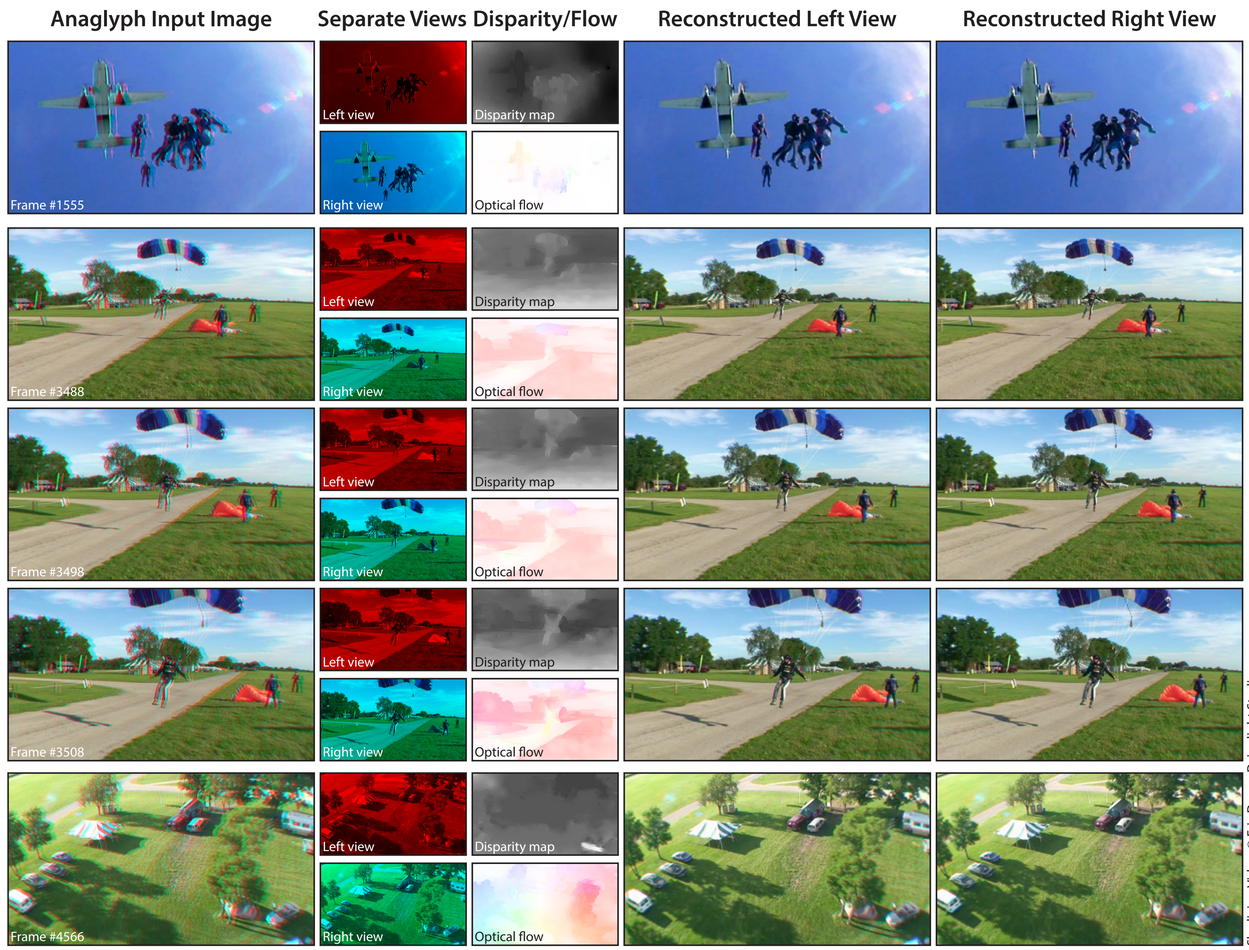
Per-frame disparity maps produce temporally incoherent results. We enforce temporal coherence of the disparity maps using Lang et al.'s framework [2012]. Compare to disparity maps on the left.



Colorization

Some parts of a scene are only visible in one of the two views. In these areas, we use the edge information of the existing color channels to guide the colorization of the other channels from regions that are nearby in space, and along temporal motion trajectories, using the domain transform [Gastal & Oliveira 2011].





Source Code

We make our source code **available for free** under a BSD-like license, including:

- Our Video De-Anaglyph tool
- SIFT Flow [Liu et al. 2011]
- Domain Transform [Gastal & Oliveira 2011]
- Practical Temporal Consistency [Lang et al. 2012]

See project website: http://richardt.name/video-deanaglyph

Want To Know More? Come To Our Talk!

Thursday, 14 August 3:45 PM – 5:15 PM
West Building, Rooms 118–120

References

Gastal, E. S. L., and Oliveira, M. M. 2011. Domain transform for edge-aware image and video processing. *ACM Transactions on Graphics 30*, 4, 69:1–12.

Lang, M., Wang, O., Aydin, T., Smolic, A., and Gross, M. 2012. Practical temporal consistency for image-based graphics applications. *ACM Transactions on Graphics 31*, 4, 34:1–8.

Liu, C., Yuen, J., and Torralba, A. 2011. SIFT flow: Dense correspondence across scenes and its applications. *Transactions on Pattern Analysis and Machine Intelligence 33*, 5, 978–994.