



FrameBreak: Dramatic Image Extrapolation by Guided Shift-Maps

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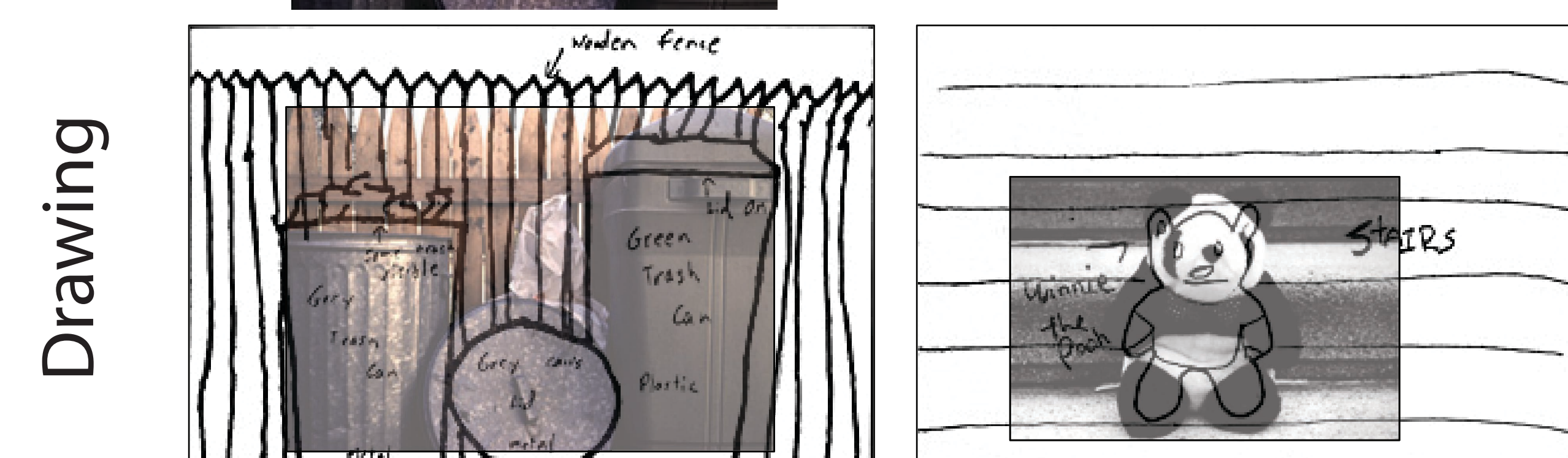
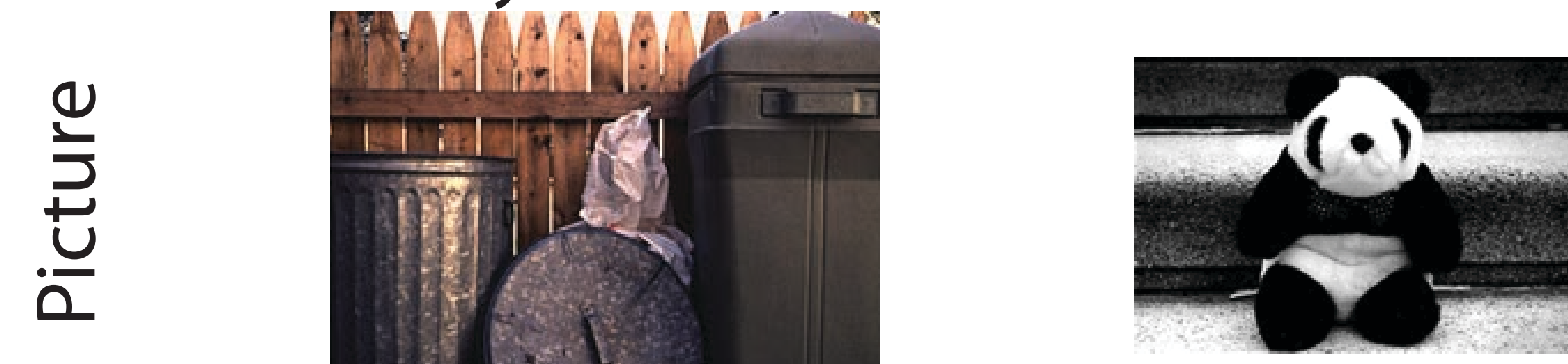
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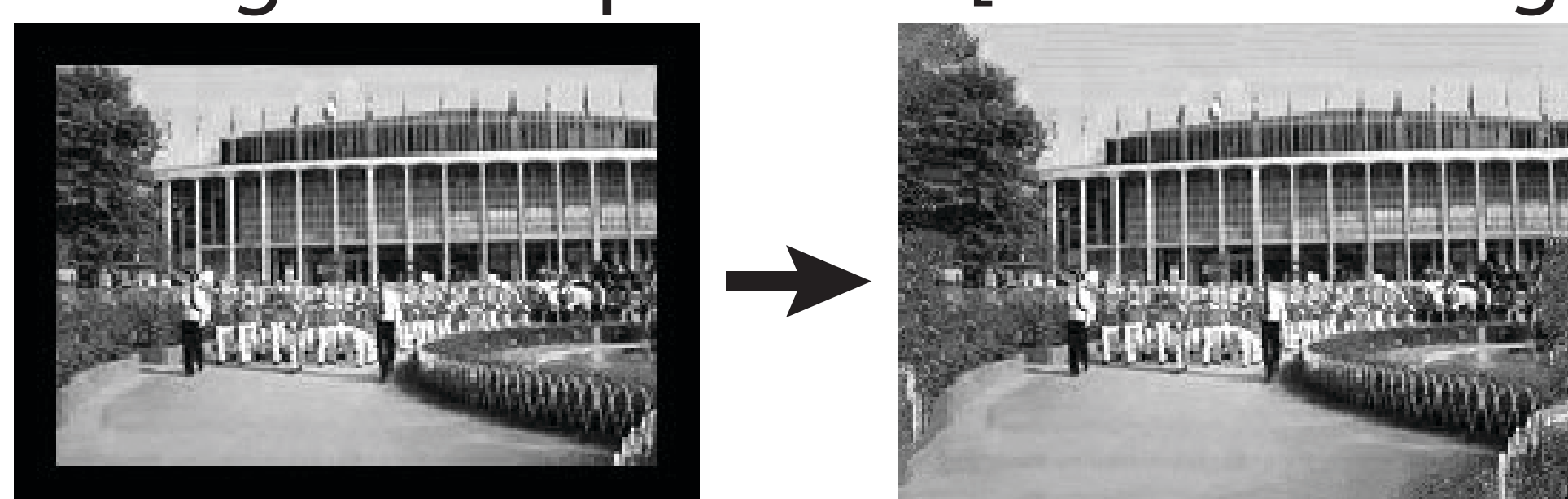


Motivations

Boundary Extension in Human Vision [2]



Small-margin Extrapolation [Efros & Leung 1999]



Data-driven Hole Filling [Hays & Efros 2007]



Parametric Guided Extrapolation [1]

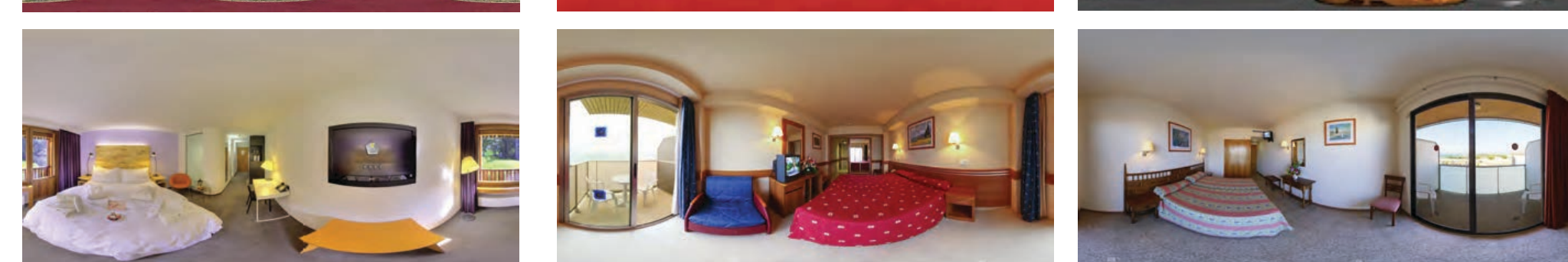


SUN360 Panorama Dataset[1]

theater



hotel room



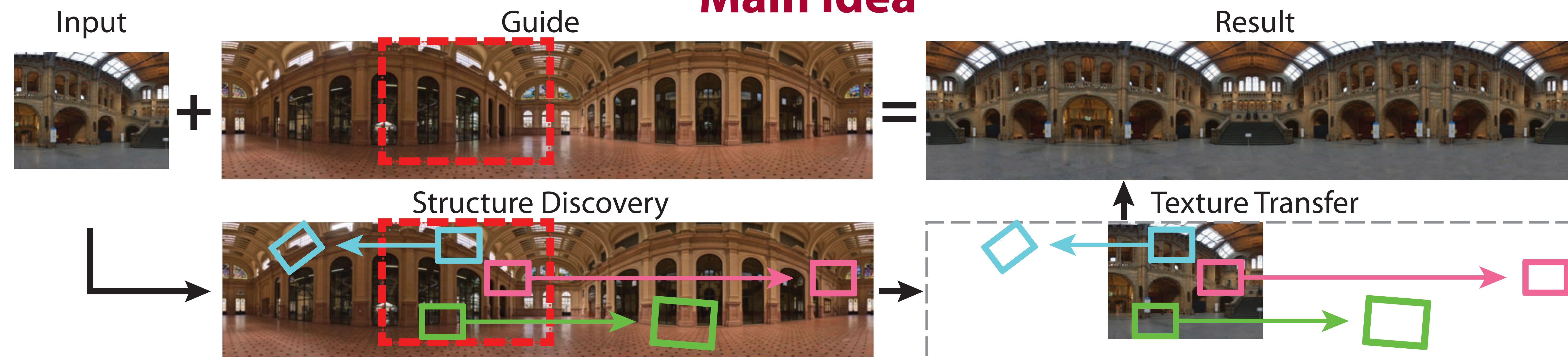
street



<http://sun360.mit.edu>

80 categories, 67583 panoramas, 9104x4552 resolution

Main Idea



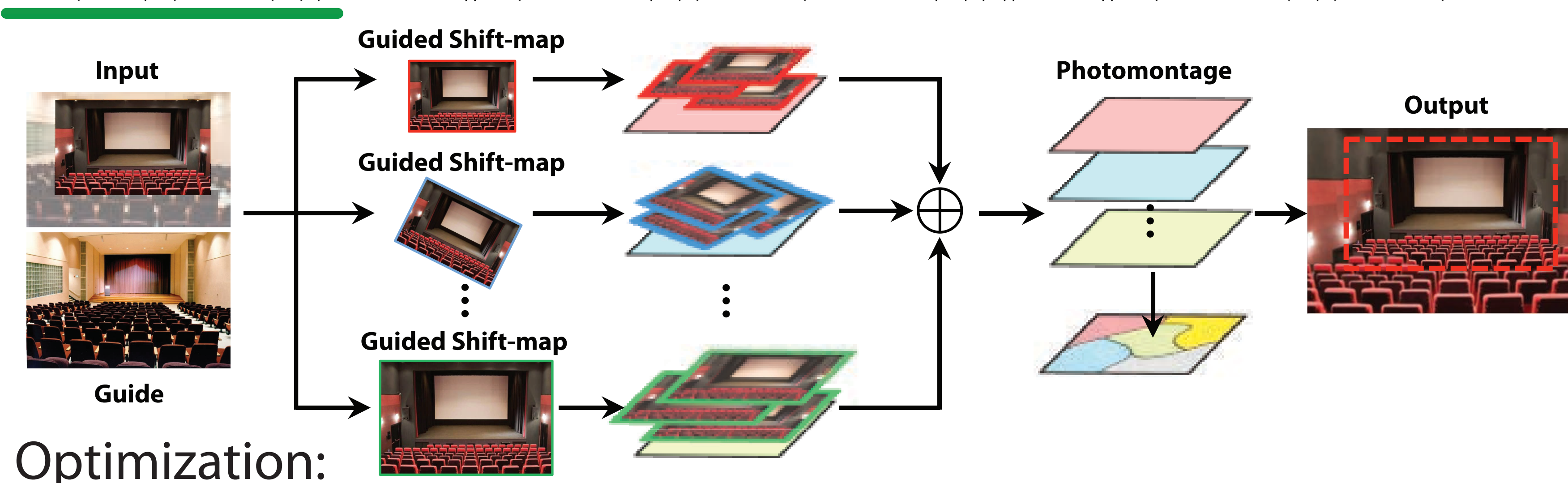
Guided Shift-Maps

Preserve Structure Relationship Bidirectional Smoothness Constraints

$$E(M) = \sum_q E_d(M(q)) + \sum_{(p,q) \in N} E_s(M(p), M(q)),$$

$$E_d(M(q)) = \|R(q, I_g) - R(q \circ M(q), I_g)\|_2,$$

$$E_s(M(p), M(q)) = \|I(q \circ M(q)) - I(q \circ M(p))\|_2 + \|I(p \circ M(q)) - I(p \circ M(p))\|_2.$$



Optimization:
Step 1: Fix rotation + scaling + reflection, solve an optimal translation map.
Step 2: Merge using photomontage.

Comparisons



Reference

- [1] Recognizing Scene Viewpoint using Panoramic Place Representation. Xiao, Ehinger, Oliva and Torralba. CVPR 2012.
- [2] Wide-angle memories of close-up scenes. Introub and Richardson. Journal of experimental psychology 1989.
- [3] Shift-map image editing. Pritch, Kav-Venaki and Peleg. ICCV 2009.
- [4] Interactive digital photomontage. Agarwala, Dontcheva, Agrawala, Drucker, Colburn, Curless, Salesin and Cohen. SIGGRAPH 2004.

Results

