Interactive Digital Photomontage

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Photomontage : What does it mean

Combining parts of a set of photographs into a single composite picture ---(of course with minimum visible artifacts !!!!)

Issues Involved

- How to select the seams where to cut the images so that they merge as seamlessly as possible in the composite image ?

- How to minimize the remaining artifacts in the composite image?

Video

Overview of the Approach

- Choosing seams
  - Use Graph Cut

- Minimizing the remaining artifacts
  - Gradient domain fusion based on Poisson equation

Image Objectives

- Designated Color
- Minimum or maximum luminance
- Minimum or maximum Contrast
- Minimum or maximum likelihood
- Eraser
- Minimum or maximum difference
- Designated Image

Seam Objectives

- Colors – match colors
- Colors and gradients
- Colors and edges – prefer seams that lie along edges

Seam objectives are global

Graph Cut

$$C(L) \; = \; \sum_{p} C_d(p, L(p)) + \sum_{p,q} C_i(p, q, L(p), L(q))$$

Graph Cut

- Data Penalty
  - Designated Color – Euclidean distance of color to be assigned from color in source image
  - Designated Image - 0 if same label
  - Eraser – Euclidean distance of source from current composite (?)

Graph Cut

- Interaction Penalty – seam objectives

$$= 0 \text{ if same labels}$$

Colors – $\quad \|S_{L(p)}(p) - S_{L(q)}(p)\| + \|S_{L(p)}(q) - S_{L(q)}(q)\|$

Gradients

Colors and Gradients

Color and edges - $\|S_{L(p)}(p) - S_{L(q)}(p)\| + \|S_{L(p)}(q) - S_{L(q)}(q)\|$

scalar edge potential computed using sobel

Gradient Domain Fusion

- Use labels on composite to determine the source gradient field.

- Same as in Perez et al.

- Add a constraint – user chooses a pixel whose color constrained to color in source image

Applications

- Selective Composites

Applications

- Selective Composites
- Extended depth of field

Result – used maximum local contrast

Applications

- Selective Composites
- Extended depth of field
- Relighting

Result – using max or min luminance

Applications

- Selective Composites
- Extended depth of field
- Relighting
- Stroboscopic visualization of movement

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- Time lapse mosaics

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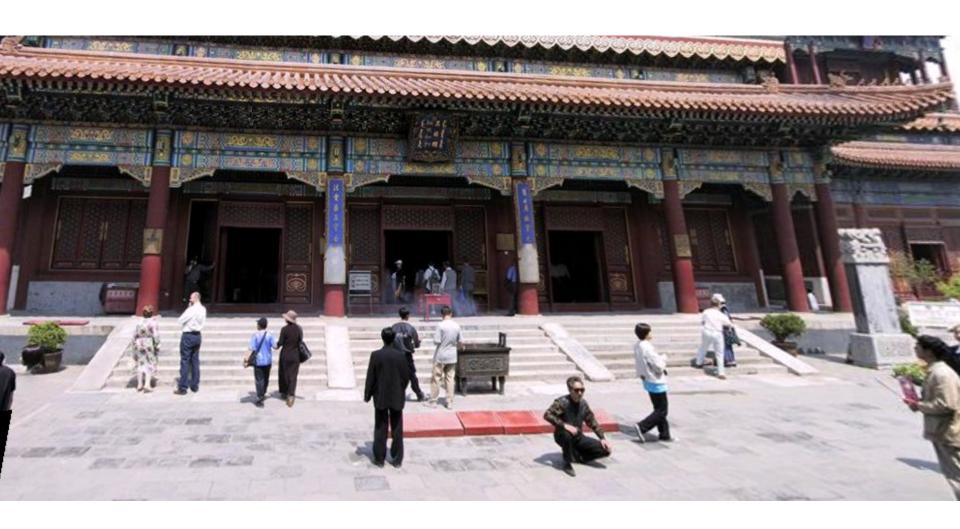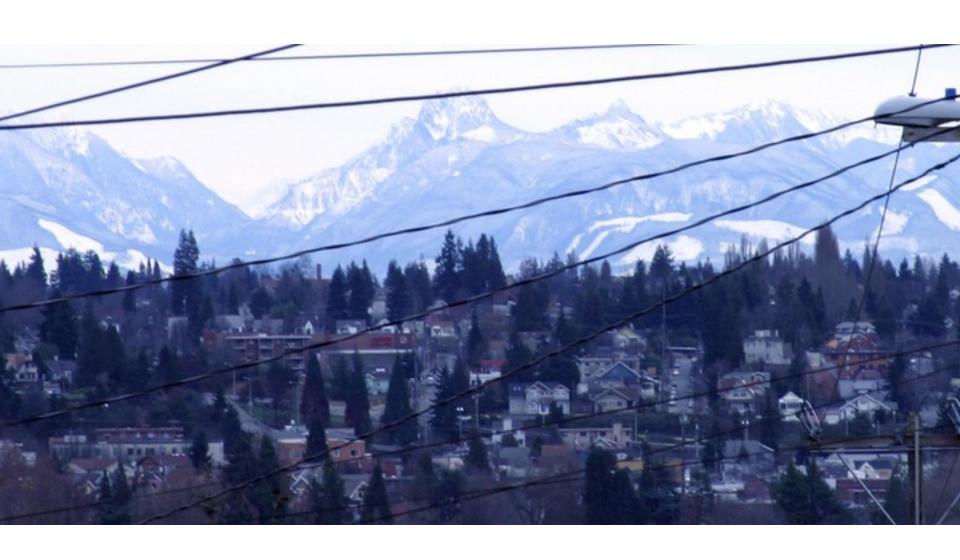- Time lapse mosaics
- Panoramic stitching

Result

Applications

- Selective Composites
- Extended depth of field
- Relighting
- Stroboscopic visualization of movement
- Time lapse mosaics
- Panoramic stitching
- Clean plate production

Result – using max or min likelihood