SURVEY OF SEAMLINE BLENDING TECHNIQUES

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Outline

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  - Intermediate
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Motivation

Unblended

Blended
Images Used For Simple Methods
Unblended Image
Simple: Feathering

• Apply a filter along the seamline

• Blends the point where the images meet

\[ I(x, y) = \begin{cases} 
  I_1(x, y), & x < \text{blend zone} \\
  w(x) \cdot I_1(x, y) + (1 - w(x)) \cdot I_2(x, y), & x = x_0 \\
  I_2(x, y), & x > \text{blend zone} 
\end{cases} \]
Simple: Feathering
Simple: Pyramid Blending

- Computationally efficient
  - Construct Laplacian pyramids for each image
  - At each level, spline the centerline of the pyramids together
  - Reconstruct the image from the splined pyramids

\[ LS_i(i, j) = \begin{cases} LA_i(i, j) & \text{if } 1 < 2^{N-1} \\ \frac{(LA_i(i, j) + LB_i(i, j))}{2} & \text{if } i = 2^{N-1} \\ LB_i(i, j) & \text{if } i > 2^{N-1} \end{cases} \]
Simple Pyramid Blending
Intermediate: GIST

- GIST: Gradient-domain Image STitching

- Two implementations
  - GIST1 – Computes the stitched image by minimizing a cost function
    - Cost function is a dissimilarity measure between the derivatives of the stitched image and the derivatives of the input images.
    - Cost function highly penalizes inconsistent derivatives, eliminating bad stitching edges

Intermediate: GIST

- **GIST**: Gradient-domain Image STitching

- **Two implementations**
  - GIST2 – Stitch the derivative of the input images
    - Compute the derivatives in x and y of both images
    - Stitch the x and y derivatives separately to form a field
      - Any stitching method may be used

Levin A., Zomet A., Peleg S., and Weiss Y. “Seamless Image Stitching in the Gradient Domain”. 
Intermediate: GIST1

Input image $I_1$

Pasting of $I_1$ and $I_2$

Input image $I_2$

Stitching result
Intermediate: GIST1 vs. GIST2
Advanced: PLCC

- PLCC: Poisson Local Color Correction

- Two steps
  1) Find the optimal cutting curve
     \[ W(C) = \sum_{p \in C} W(p), \]
     \[ W(p) = \| \nabla I_S(p) - \nabla I_T(p) \|_1 \]
  2) Stitch the images using Poisson color matching

Sadeghi M. A., Hejrati S. M. M., Gheissari N. “Poisson Local Color Correction For Image Stitching”.
Advanced: PLCC
Advanced PLCC
Discussion/Future Work

• Evaluation is entirely subjective
  • Leads to a lot of gray areas

• Would like to run timing analysis on these
  • Timing is mentioned in the papers, but on varying computers
Questions?