Utility Package for Vision Lab

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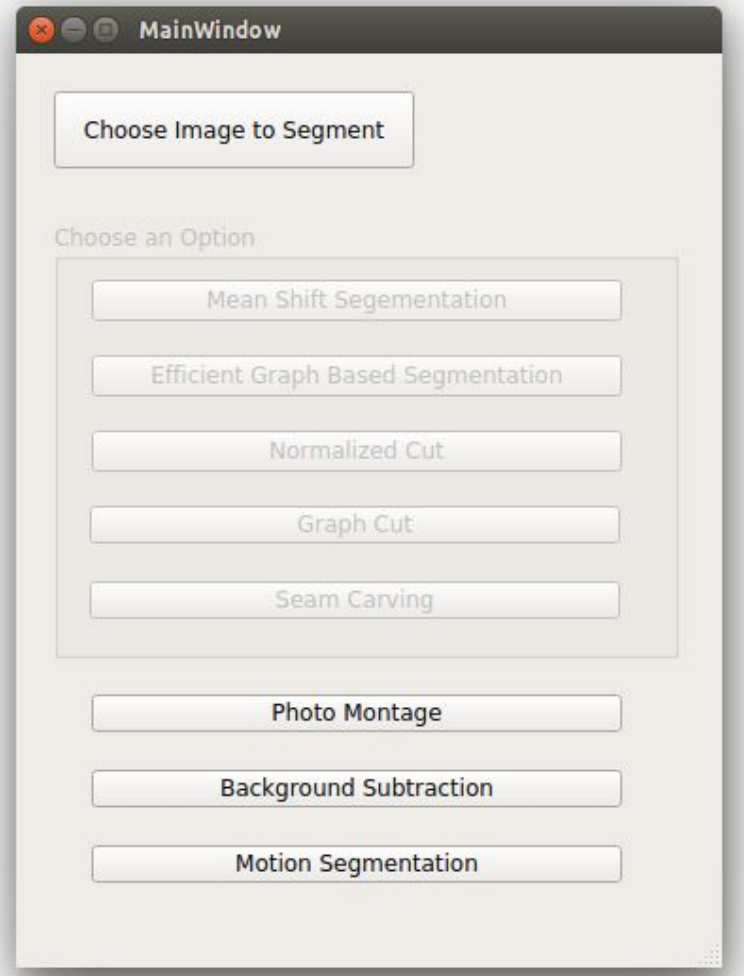
Introduction



Introduction

Various Utility functions in One package

- Image Segmentation
- Image Resizing(Seam Carving)
- Motion Segmentation
- Background Subtraction
- PhotoMontage

Implementation

- Some functions available in external libraries
- Incorporated directly from them
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- Some functions implemented using external libraries
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- Some functions implemented from very base

Implementation (cont.)

Functions directly incorporated,

- Mean-Shift Segmentation :
  - Using pyrMeanShiftFiltering() of opencv
- Photo Montage :
  - Binary available on author’s webpage
- Background Subtraction :
  - Using createBackgroundSubtractorMOG2() of opencv

Implementation (cont.)

Functions implemented using other libraries,

- EGBIS :
  - Code available on author’s page
  - Takes in image in particular format
  - Need to write wrapper to convert image and use their code
- Normalized-Cut Segmentation :
  - Normalized Cut on graphs available in python “graph” module
  - Need to super pixelate the image and convert it to graph

Implementation (cont.)

Graph-Cut Image Segmentation :

- “gco” library provided on author’s page
- Need to create a graph with data costs and label costs
- Firstly, applied k-means on image
- Data-cost of each pixel is |pixel_value - cluster_center_value|
- More the label cost, more the smoothness of segmentation
- Label-cost is constant if labels are equal otherwise zero.
- User can interactively increase or decrease smoothness and apply $\alpha\beta$-swap or α-expansion

Implementation (cont.)

Seam Carving：

- Implemented Seam Carving Algo. for Image Resizing from base
- User can see interactively which seams are getting removed
- User can draw over image for Object Removal or Saving.

Implementation (cont.)

Motion Segmentation :

- Calculated dense Optical flow using opencv
- Calculated magnitude and direction of optical flow
- Applied k-means on magnitude and direction
- Drawback : Need to know no. of moving objects in scene
- User can interactively control no. of moving objects in scene

Some Results

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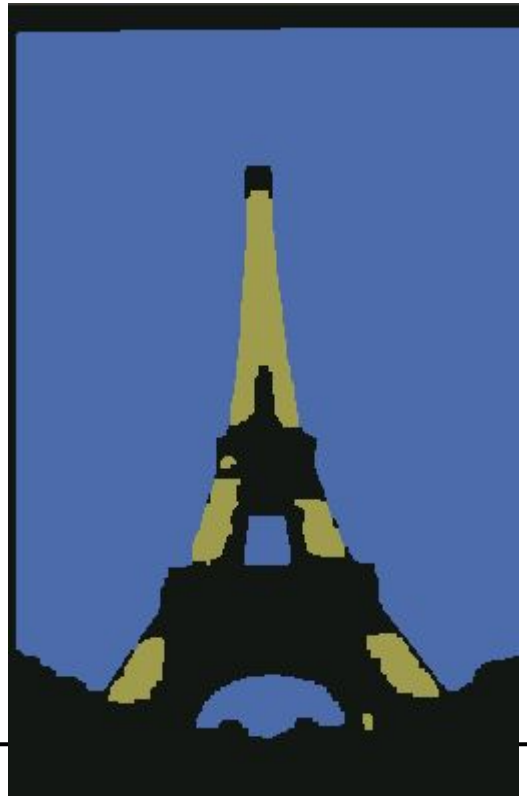

Future Work

- Incorporate more Motion Segmentation Techniques
- Find optimal ordering of seams deletion

Thank You!