Computer Vision: Problem Set 1

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September 21, 2009

II.5

seals.jpg Even though the sky was sacrificed to make the content aware resized picture look better, the output is still prefereable to the normally resized version. Especially considering the sea lions and the visibility of the humans on the cliff. Only vertical resizing took place.

original width: 500
original height: 375
original resized width: 500
original resized height: 175
width step: 150
height step: 150
width first

w: 500, h: 375, wr: 500, hr: 175, wStep: 150, hStep: 150, widthFirst

trees.jpg Because the trees itself do not contain edges along their trunk and the trees reach from the top to the bottom of the picture without interruption, seams will be located inside those trunks causing the trees to become thinner when resizing horizontally. This effect is not wanted, distorting the image in a way that makes the ouput pretty much unuseable besides being artistic.

original width: 500
original height: 375
original resized width: 175
original resized height: 275
width step: 50
height step: 50
height first

w: 500, h: 375, wr: 175, hr: 275, wStep: 50, hStep: 50, heightFirst

groceries.jpg The main problem in this picture are the dominant diagonal edges. Sooner or later every seam has to cut something from those edges distorting them.

original width: 500
original height: 375
original resized width: 300
original resized height: 175
width step: 1
height step: 1
width first

w: 500, h: 375, wr: 300, hr: 175, wStep: 1, hStep: 1, widthFirst

prison1.jpg From looking out of a prison to looking into someones garden. The algorithm thinned the prision bars down to a fence. Due to missing edges in the bars themselves and because they reach from the bottom to the top of the image the bars are thinned but not completely removed as they form strong edges when they get thinner.

original width: 450
original height: 338
original resized width: 250
original resized height: 238
width step: 20
height step: 20
width first

http://www.cjasper.com/images/Digitals/Structures/prisonwindow2.jpg

croco1.jpg On this image the writting is preserved perfectly. The crocodile or aligator is less distroted, too. All in all this image is very successfully resized by the content aware resizing algorithm.

original width: 650
original height: 431
original resized width: 650
original resized height: 231
width step: 20
height step: 20
width first

w: 650, h: 431, wr: 650, hr: 231, wStep: 20, hStep: 20, widthFirst

http://www.arkive.org/media/12/12A1CE8E-DBD3-49DC-B6F9-65A4EF88259B/Presentation.Large/photo.jpg

croco2.jpg This image was a little distorted, making the bird braver than it actually is. Also there are some artifacts in the background made of green and black lumps.

original width: 640
original height: 445
original resized width: 650
original resized height: 245
width step: 50
height step: 50
height first

w: 640, h: 445, wr: 640, hr: 245, wStep: 20, hStep: 20, widthFirst

http://i27.photobucket.com/albums/c152/Thackrah/00955.jpg

Further image acknowledgements: Thanks to the following Flickr users for sharing their photos under the Creative Commons license:

- seals.jpg is provided by allotrope.
- trees.jpg is provided by russelljsmith.
- groceries.jpg is provided by The Consumerist.

III Extra credit

1. Use the function `output = removeObject(im, varargin)` to specify a polygon to be removed. `im` is the image to work on and `output` is the imag without the specified object. `varargin` may specify by what means the object shall be removed (widthWeighted, heightWeighted, mixedWeighted, width, height, auto or autoWeighted). "weighted" always means that manipulation of the energy map will be applied. Without weighting seams

will be removed until the polygon is gone. In the following image, the people on the cliff were removed (width only and weighting reduction):

object removed

Yet the method used produces some heavy artifacts as it marks the whole region as a low energy region depending on the surounding energy (same polygon to remove, but using height only reduction):

object removed

This method was used because removing seams and hoping for the polygon to be gone after while resulted in reducing the image to zero width or height. Better results may be produced by not marking the whole region as low energy, but setting one random pixel as low energy (in the seals picture this resulted in reducing the image to zero as well) or reducing the reduction window on a limited section around the polygon, which might cause different artifacts.

2. no
3. no
4. no