UNIVERSITY OF CALIFORNIA, SANTA BARBARA
Department of Electrical and Computer Engineering

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ECE 178 Introduction to Digital Image and Video Processing

Fall 2017

Homework 8

Due on GauchoSpace on Friday December 1st, by 9 pm

In this Matlab assignment we are going to implement the key steps in the image resizing algorithm proposed in "**Seam Carving for Content-Aware Image Resizing**." You have to remove "seams" until the size of the processed image reaches the target size (you do not need to consider how to enlarge an image).

The four functions you have to implement are described as follows:

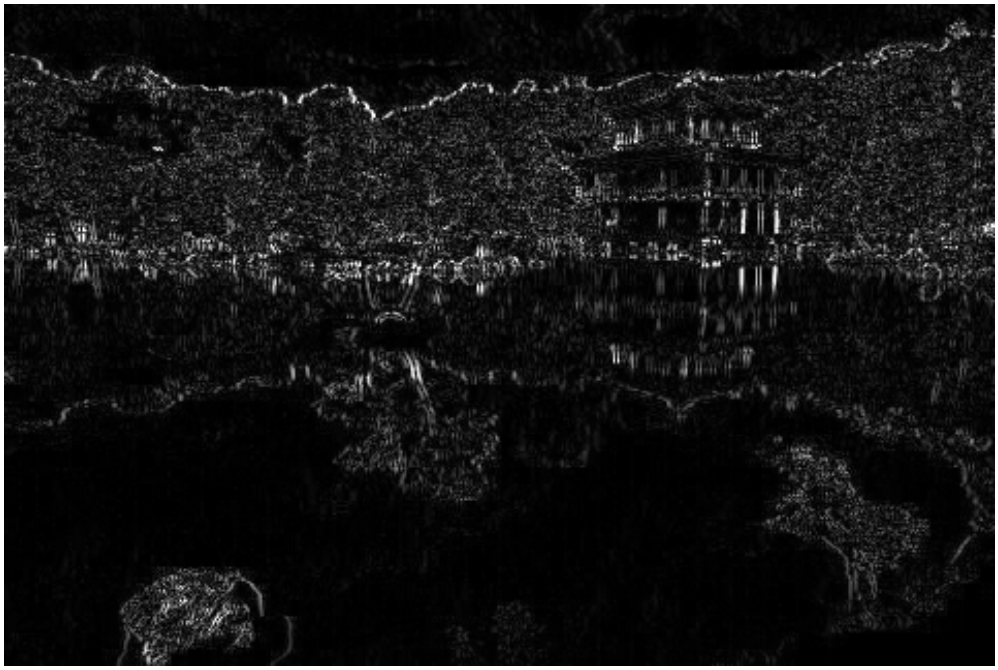
1. *myEnergyFunc.m*: this function takes a color image and outputs the energy image. The gradients of an image are a good measure (you may use built in functions for this), but you can also use other energy functions described in the paper. It might be a good idea to apply filtering before computing the energy to remove noise. Also note that the energy should be a single value per pixel. If you use gradients, you have to find a way to combine the gradients of different color channels into one single value.

2. *mySeamCarve_V.m*: this function takes an energy map as an input and outputs the **vertical** "seam" with minimum energy and it's corresponding energy.

3. *mySeamCarve_H.m*: this function takes an energy map as an input and outputs the **horizontal** "seam" with minimum energy and it's corresponding energy.

4. *mySeamCarveResize.m* This function takes a color image, the number of columns to be removed, and the number of rows to be removed as inputs. The output is the resized image. This function will use the above functions to resize the image to the target size. You **do not** have to find the optimal seam carving order. Simply carve out the vertical seams, then the horizontal ones (or vice versa) and you will get full credit.

The energy map would look like this (without applying Gaussian filtering):



Your result might differ from this, because we might use the different energy functions in the *myEnergyFunc.m*.
The resized image should look like this:

(a) Without applying Gaussian filtering in $myEnergyFunc$

(b) Applying Gaussian filtering with $\sigma = 1$ in $myEnergyFunc$

For submitting your code, please upload one zipped file including only 4 files (*myEnergyFunc.m*, *mySeamCarve_V.m*, *mySeamCarve_H.m*), and *mySeamCarveResize.m*. You **don't have to** attach your result images. Name your zip file in this format: <Perm number>_<First name>_<Last name>_HW8. Good luck!