Jacob Oakes & Graham Fuller
Lab 3

http://www.picturesocial.com/photo/railway-7

Whole-matrix operations on images

There are two types of matrix multiplication that can be performed in Matlab.
C = A * B performs regular matrix multiplications. On the other hand, placing a dot in front of the multiplication sign, C = A .* B, multiplies by element. For example, C(1,1) would equal A(1,1) * B(1,1).

Filters

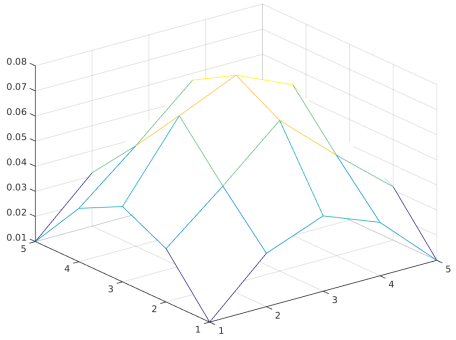
Gaussian Filter Guess:

0.01	0.03125	0.04	0.03125	0.01

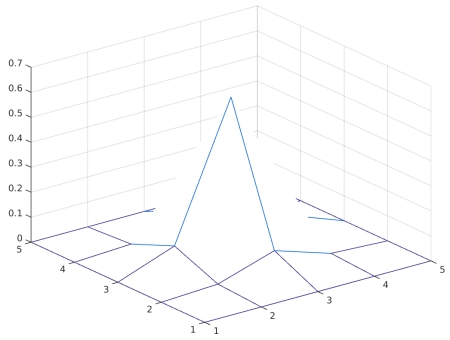
0.03125	0.05	0.07	0.05	0.03125
0.04	0.07	0.08	0.07	0.04
0.03125	0.05	0.07	0.05	0.03125
0.01	0.03125	0.04	0.03125	0.01

Gaussian Filter Actual:

0.0000	0.0000	0.0002	0.0000	0.0000
0.0000	0.0113	0.0837	0.0113	0.0000
0.0002	0.0837	0.6187	0.0837	0.0002
0.0000	0.0113	0.0837	0.0113	0.0000
0.0000	0.0000	0.0002	0.0000	0.0000



Guess



Actual

Our guess weighs closer neighbors less heavily than the actual Gaussian filter for a 5x5 matrix. This can be seen by comparing the figures between the two and noticing the actual one is much steeper. Our guess is also smoother than the actual. The actual only really accounts for a 3x3 square within the 5x5 square whereas our guess uses a large percentage from the pixels on the perimeter. When applied to our picture, the guess Gaussian filter blurs much more than the actual.

Guess Gaussian Filter Applied

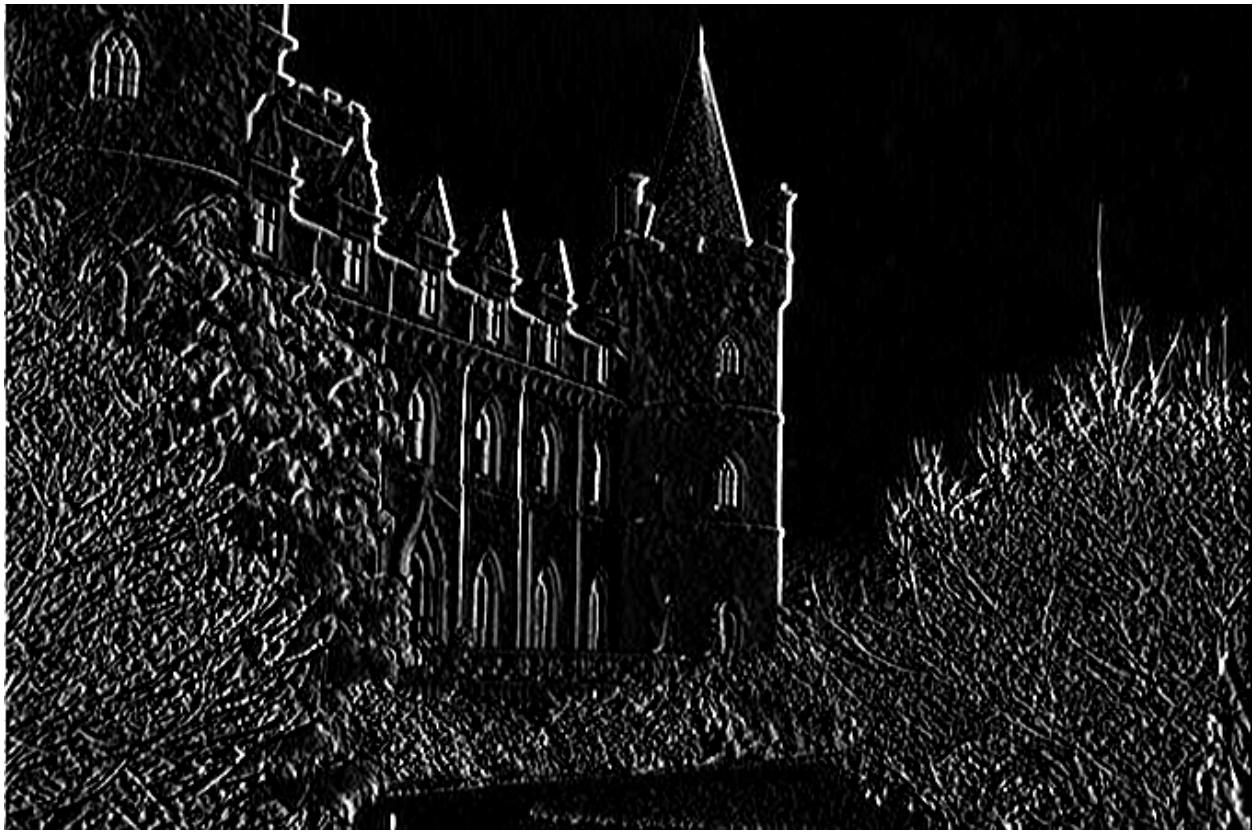
Actual Gaussian Filter Applied

Edge Detector

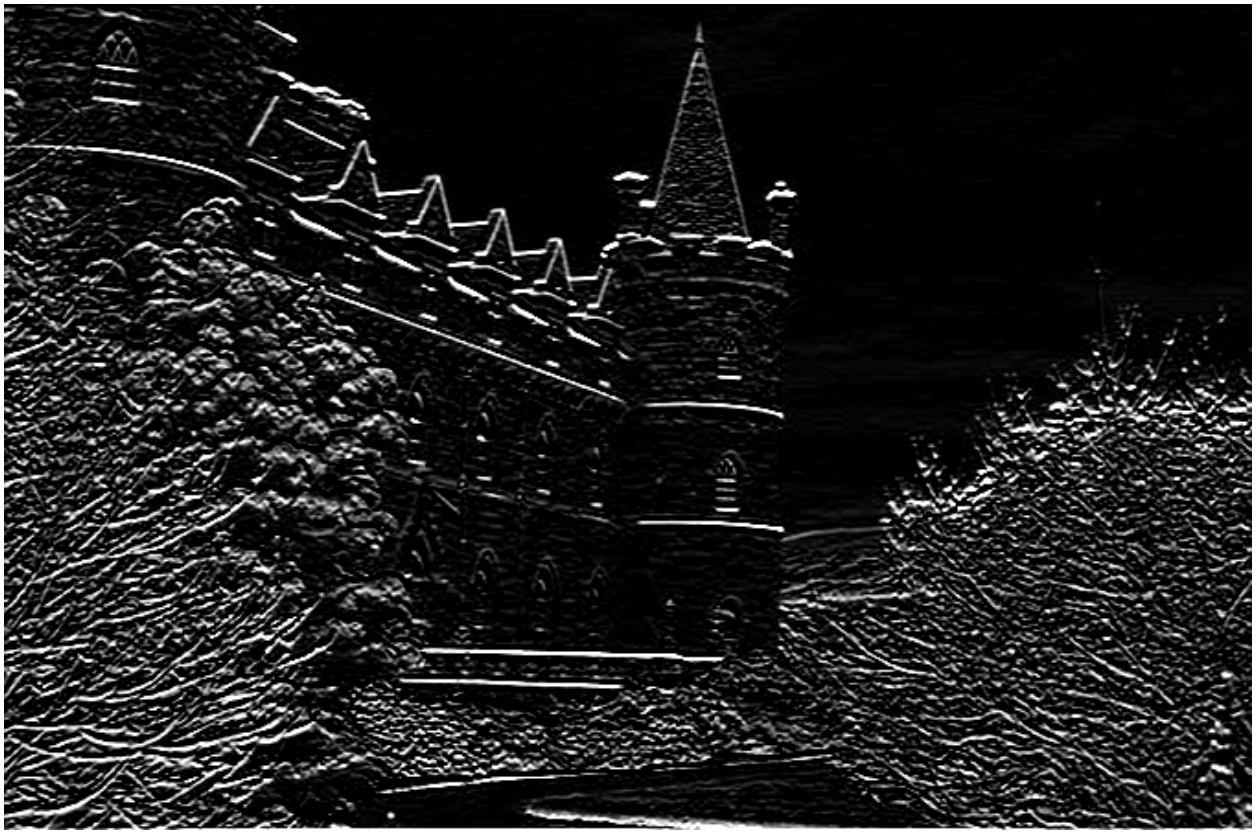
In this part of the lab we chose to switch images to better emphasize the different types of edges.

http://thekingsandqueens.wordpress.com/2013/01/20/something-different-snowy-castles/

Horizontal Edges

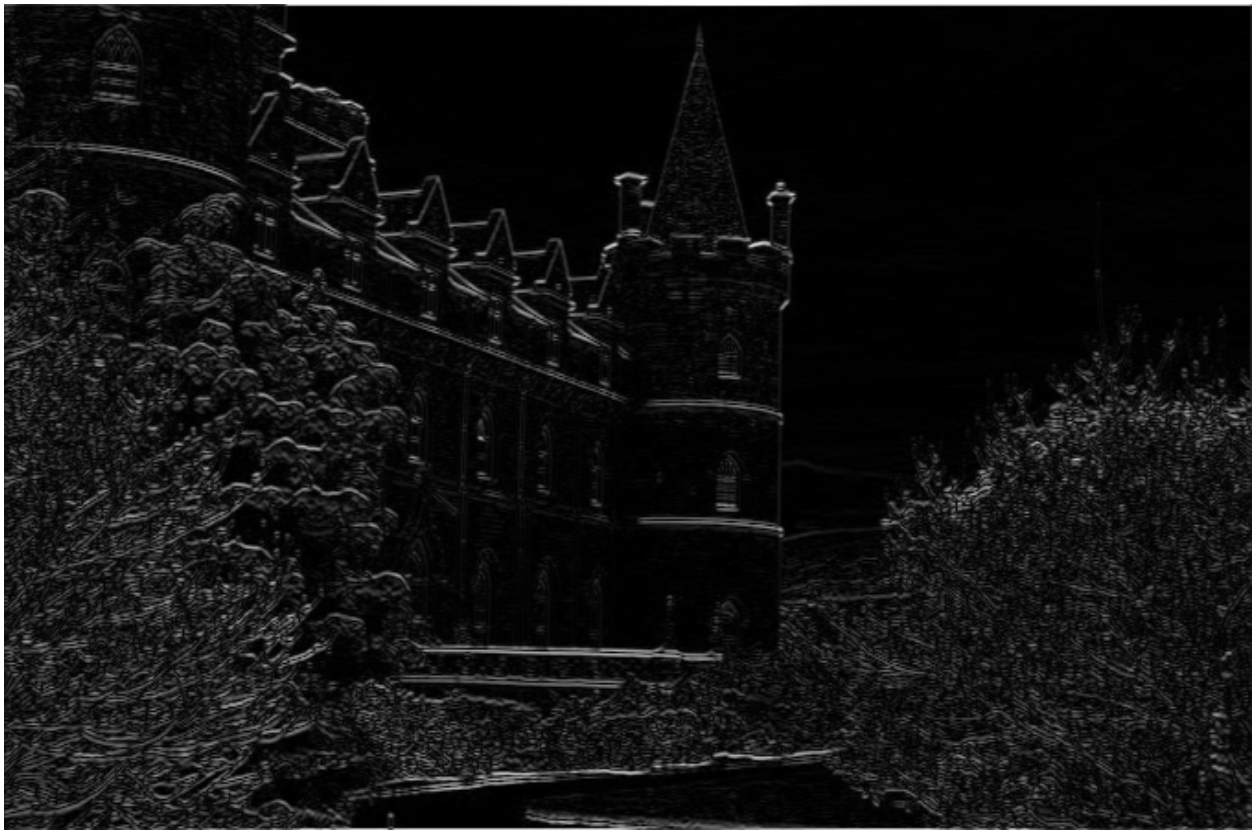


Vertical Edges

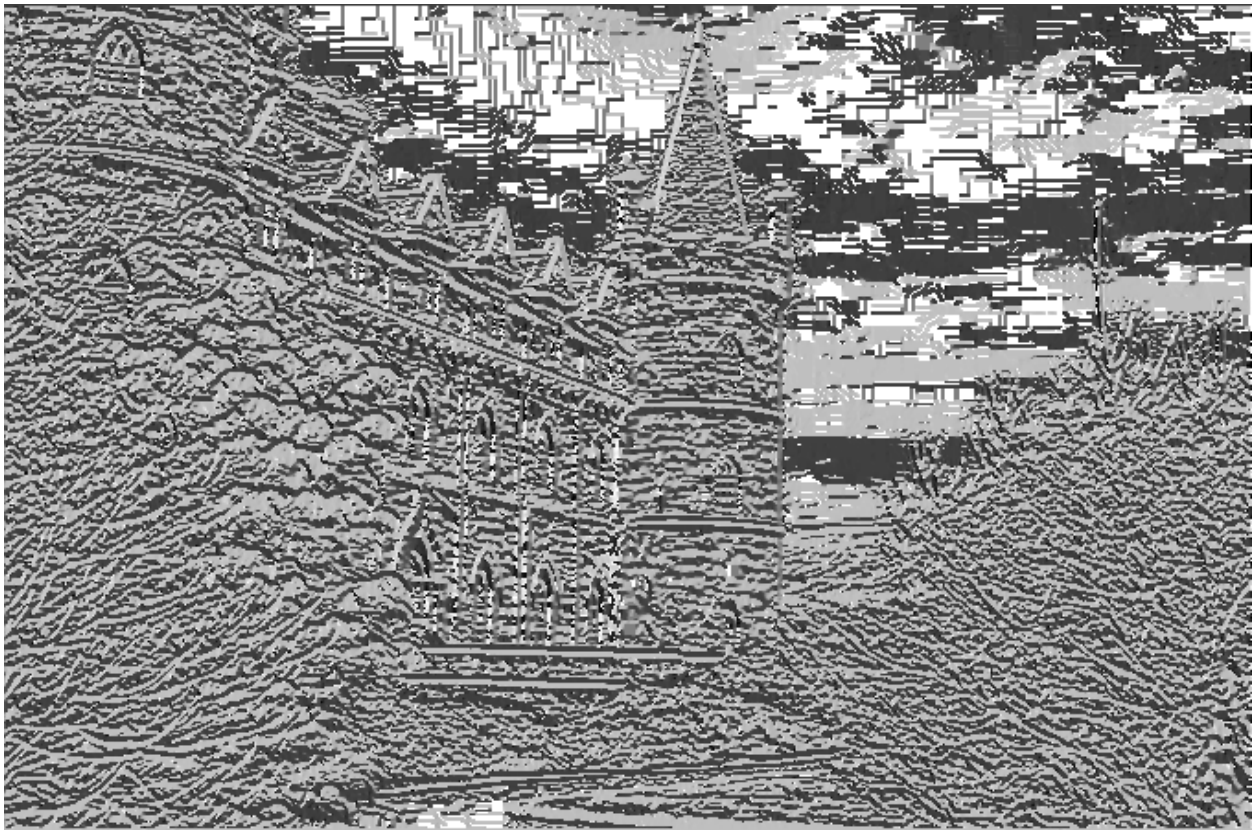


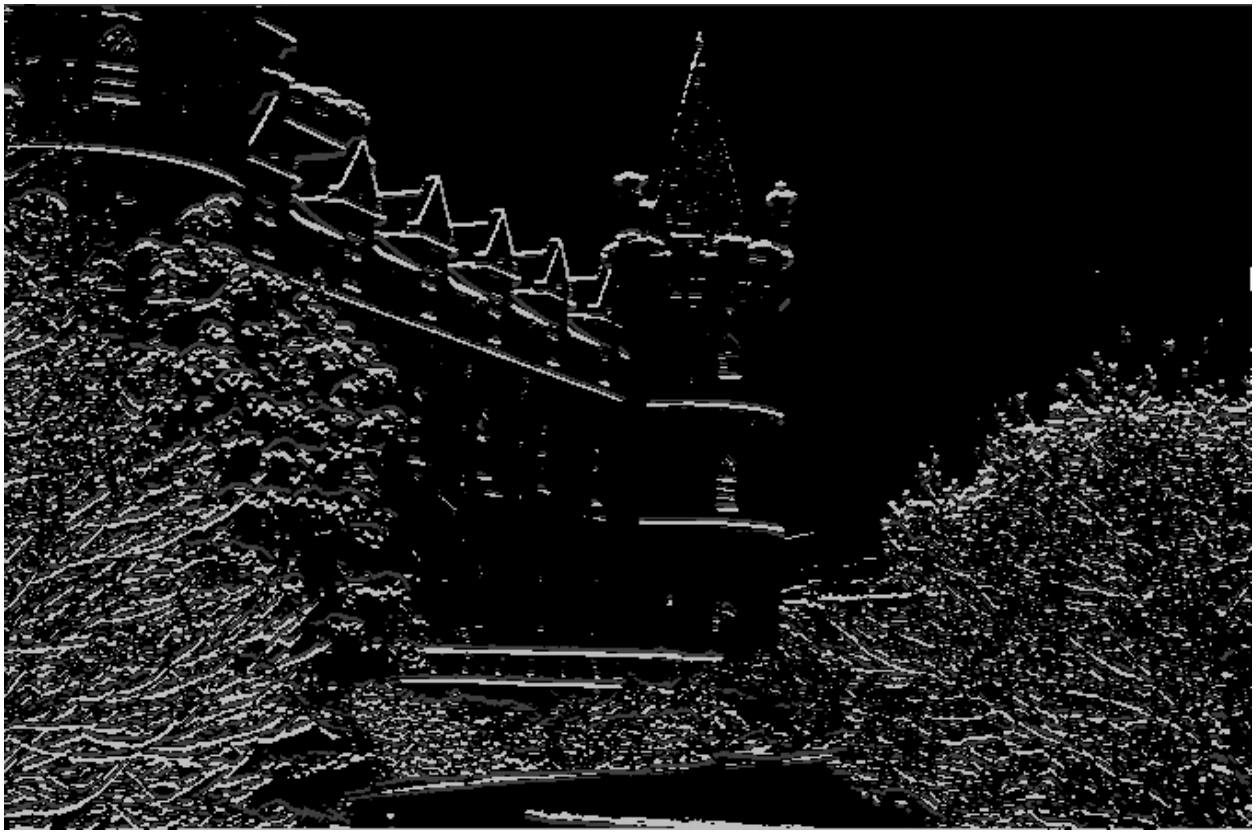
Sum of Vertical and Horizontal

Gradient



Direction



Direction with weak edges removed

For this part we chose an arbitrary threshold of ⅛ of the max of the gradient to use to remove weak edges.