CSSE463 Image Recognition

Lab 3 Edge Detector

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1. **Whole-Matrix Operations on Images**

Given:

>>A = [1 2; 3 4]; B = [5 6; 7 8]

>>C = A \* B; C=[19 22; 43 50]

>>C = A .\* B; C=[5 12;21 32]

With the \* operator, MATLAB does standard matrix multiplication. For example in this case, C(1,1)=1\*5+2\*7=19; C(1,2)=1\*6+2\*8=22; C(2,1)=3\*5+4\*7=43; C(2,2)=3\*6+4\*8=50.

With the .\*operator, MATLAB does element-wise multiplication rather than matrix multiplication. It multiplies elements that are at the same matrix position. For example in this case, C(1,1)=1\*5=5; C(1,2)=2\*6=12; C(2,1)=3\*7=21; C(2,2)=4\*8=32.

1. **5x5 Matrix Filter (.m submitted to dropbox):**

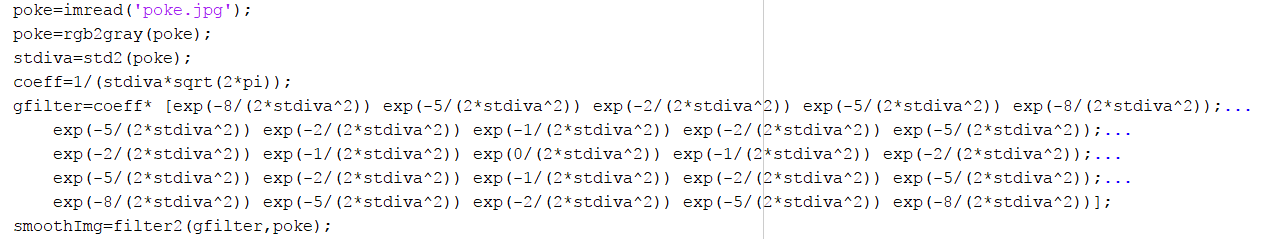


Figure 1. Guess filter



Figure 2. 5x5 guess filter and Gaussian filter meshes

Differences:

Overall, my 5x5 filter mesh has a significantly lower amplitude compare to the mesh of the real Gaussian filter. In addition to that, if I compare the difference between the max amplitude and the min amplitude of the two filters, it is apparent that the (max-min) amplitude value of the guess filter is very small compare to that of the real Gaussian filter.

When I apply both filter to my image, the guess filter provides a darker image, and has blurred many details compare to the real Gaussian filter.

1. **Sobel and Images** 
   1. Original Image (source: personal image)

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* 1. Horizontal-edge



* 1. Vertical-edge



* 1. Sum



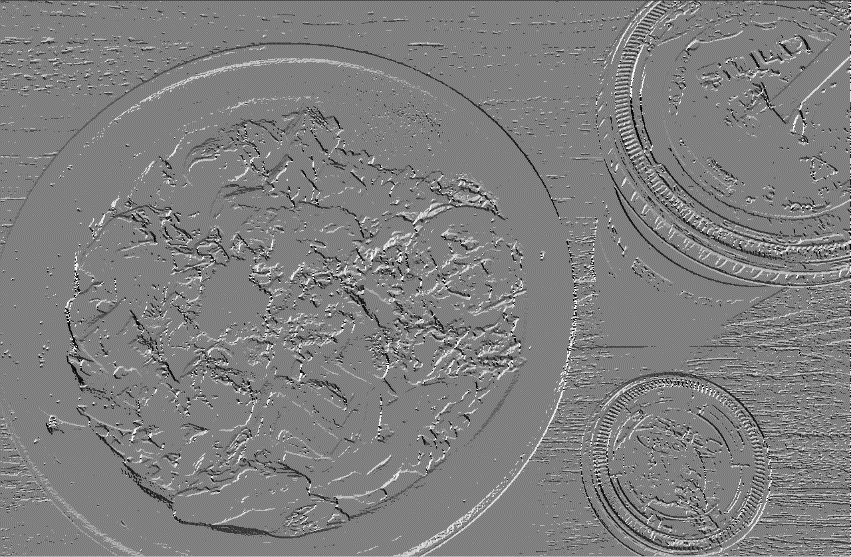
* 1. Raw magnitude



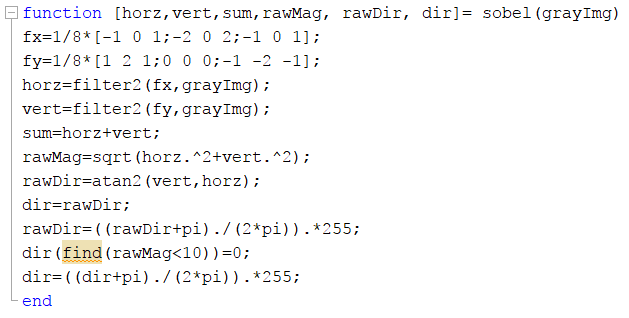
* 1. Raw direction



* 1. Direction with weak magnitude zeroed-out



1. **Sobel function (.m submitted to dropbox):**



1. **A script that calls the sobel function n(.m submitted to dropbox):**

