

Jonathon Hewitt

PA1_pb2 Report

Edge Detection:

For this report, I implemented edge detection using sobel masks. Because the masks are separable, in my implementation I perform correlation using 2 1D masks instead of the original 2D sobel mask. The masks used are as follows.

X Gradient Masks:

X direction: $[1, 0, -1]$

Y direction: $[1, 2, 1]$

Y Gradient Masks:

X direction: $[1, 2, 1]$

Y direction: $[1, 0, -1]$

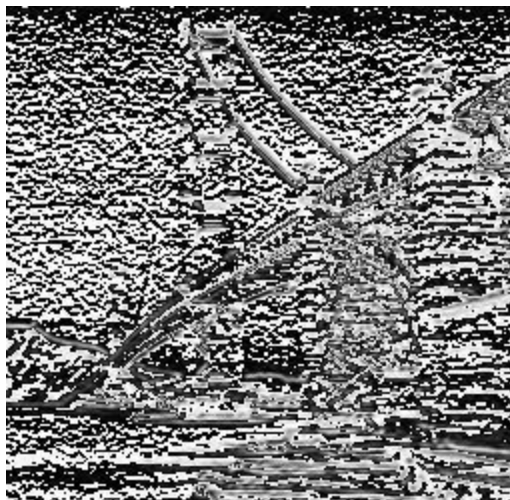
After correlating the original image with each of these masks, we get two images, the X gradient and the Y Gradient images. We combine these images by taking the magnitude at each point and summing them, resulting in the gradient magnitude image. After this image is produced, we can use thresholding to remove some noise, producing a final thresholded edge detected image. Results are shown on the lenna and sf test images with threshold = 110.

SF Results:

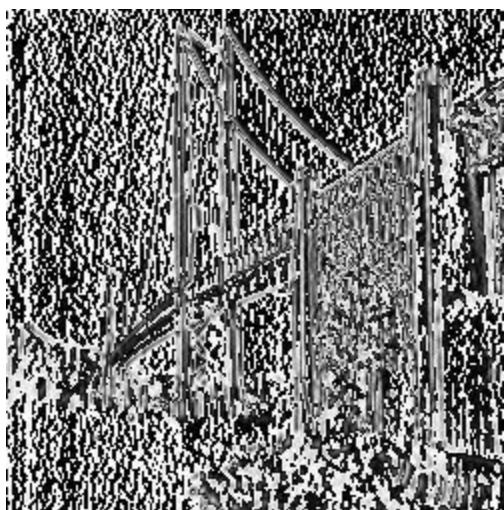
Original Image:



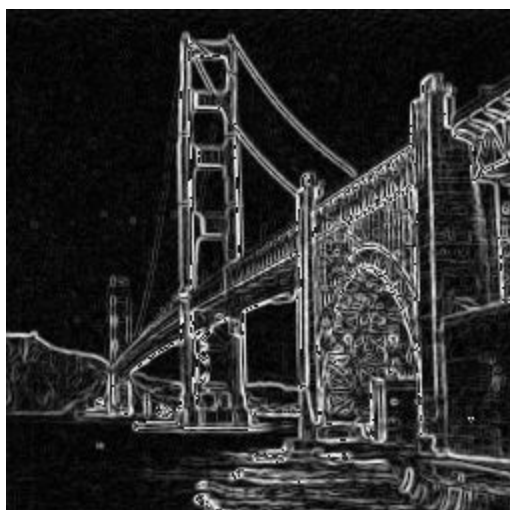
X Gradient Image:



Y Gradient Image:



Gradient Magnitude Image:



Thresholded Image:



Lenna Results:

Original Image:



X Gradient:



Y Gradient:



Gradient Magnitude:



Thresholded:



The gradient magnitude images would be the equivalent of using a threshold of 0. As we can see, in the original gradient magnitude images there's a lot of noise in the background of both images. By thresholding the image, we only show the more drastic changes in intensity that happen in the image.