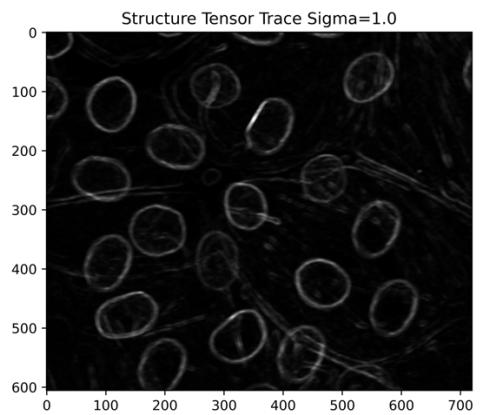
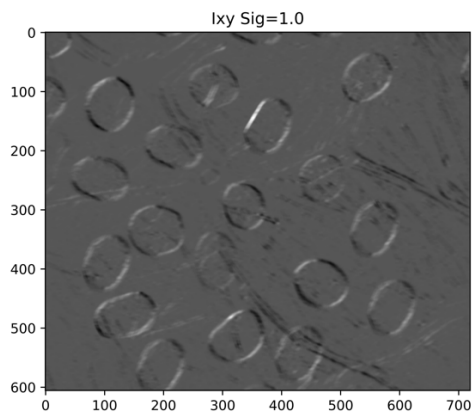
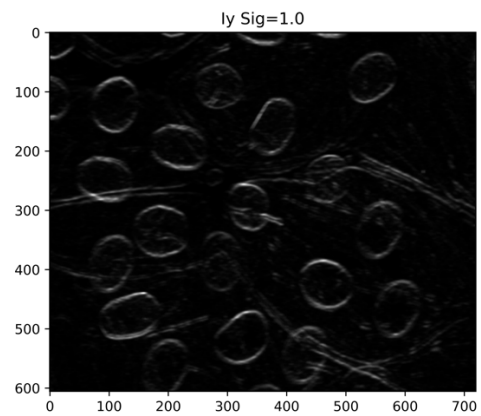
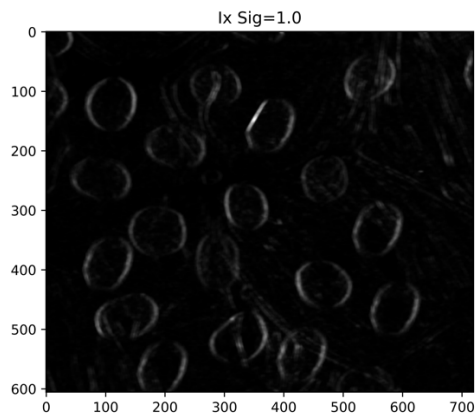


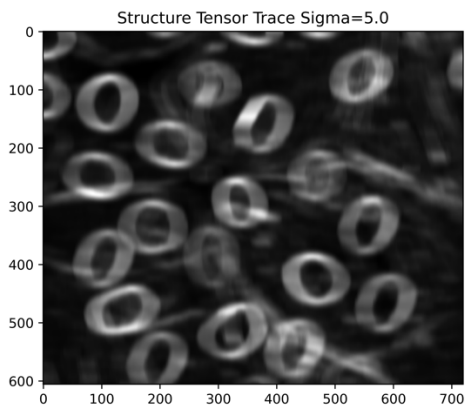
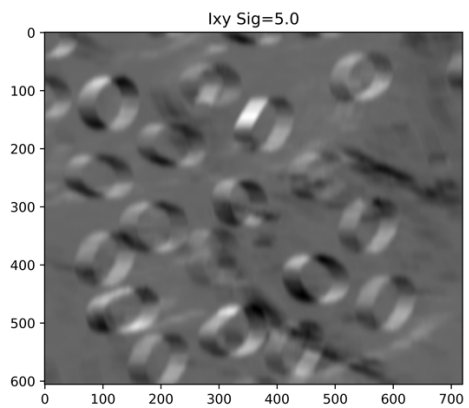
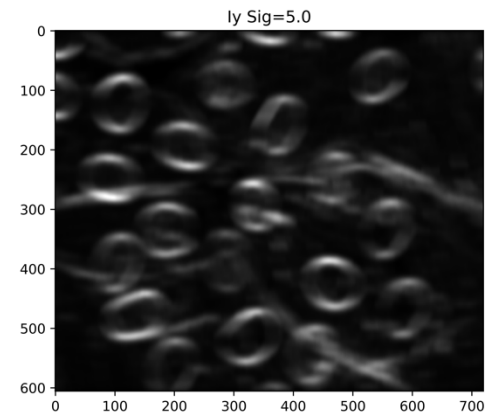
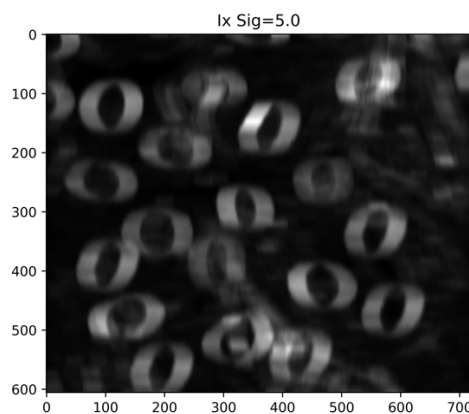
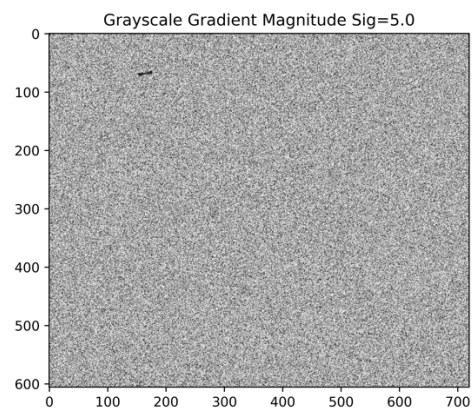
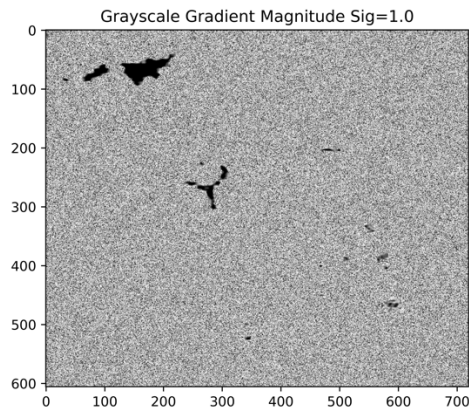
CMP\_SC 8690: Computer Vision  
Homework 1B: Color Edge Detection  
By: Mikey Joyce  
Due: 2/8/2024

Abstract:

The goal of this assignment is to demonstrate utilizing OpenCV and NumPy to perform computational tasks relating to imaging. More specifically exploring the computation of the color structure tensor and how it can be useful in computer vision.

Experiments and Results:





## Conclusion:

In this assignment, we were asked to compute the image gradients (Ix and Iy) for the given RGB image. We were then asked to compute the color structure tensor and then compute the trace of this tensor. Lastly, we were asked to compute the original RGB image to grayscale and then compute the gradient magnitude for the gray image. I demonstrated the color structure tensor by showing the image gradients that I

computed  $I_x$  and  $I_y$  and then the off diagonal element  $I_{xy}$ . Since the image gradients are in the color structure tensor, I didn't show the same image multiple times. It appears that increasing the sigma increases the blur, which removes the clarity of the color changes that were detected. For the gradient magnitude, I believe the equation I have which is  $\text{np.sqrt}(I_x + I_y)$  is correct, but it is giving an interesting result, which is just basically a large amount of noise.

#### References:

- Libraries and tools: PyCharm, OpenCV, NumPy, Matplotlib, Preview.
- Lec04\_EdgeDetection.pdf
- CV2024\_HW1B.pdf