EN2550 Exercise 3 on Spatial Filtering

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1. Compare the effects of 9×9 average (box) filtering and Gaussian filtering with a 9×9 kernel and $\sigma = 4$. Use the butterfly image shown in Fig. 1.

Figure 1: Butterfly Image.

2. Create a Gaussian kernel $x, y \in [-5, 5]$ with $\sigma = 1$ and show as a surface plot. Use a spatial resolution of 0.1.

3. Consider the image shown in Fig. 2.

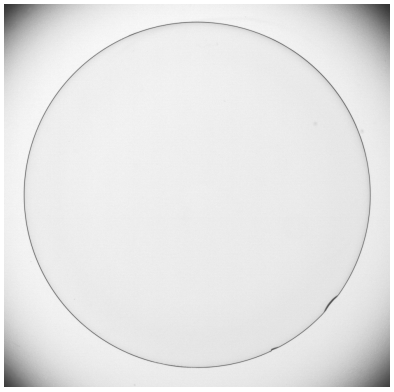

Figure 2: Contact Lens Image.

   (a) Compute and show the x and y gradients of the contact lens image. Use the Sobel kernels.

(b) Show the gradient magnitude image.

4. Carry out image sharpening on the graysclae version of the image shown in Fig. 3.

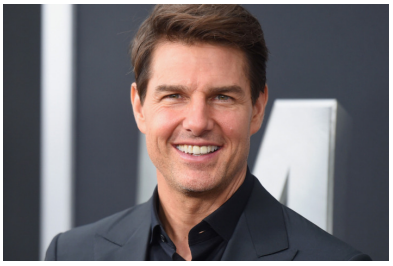

Figure 3: Image for Sharpening.