

Canny Edge Detection

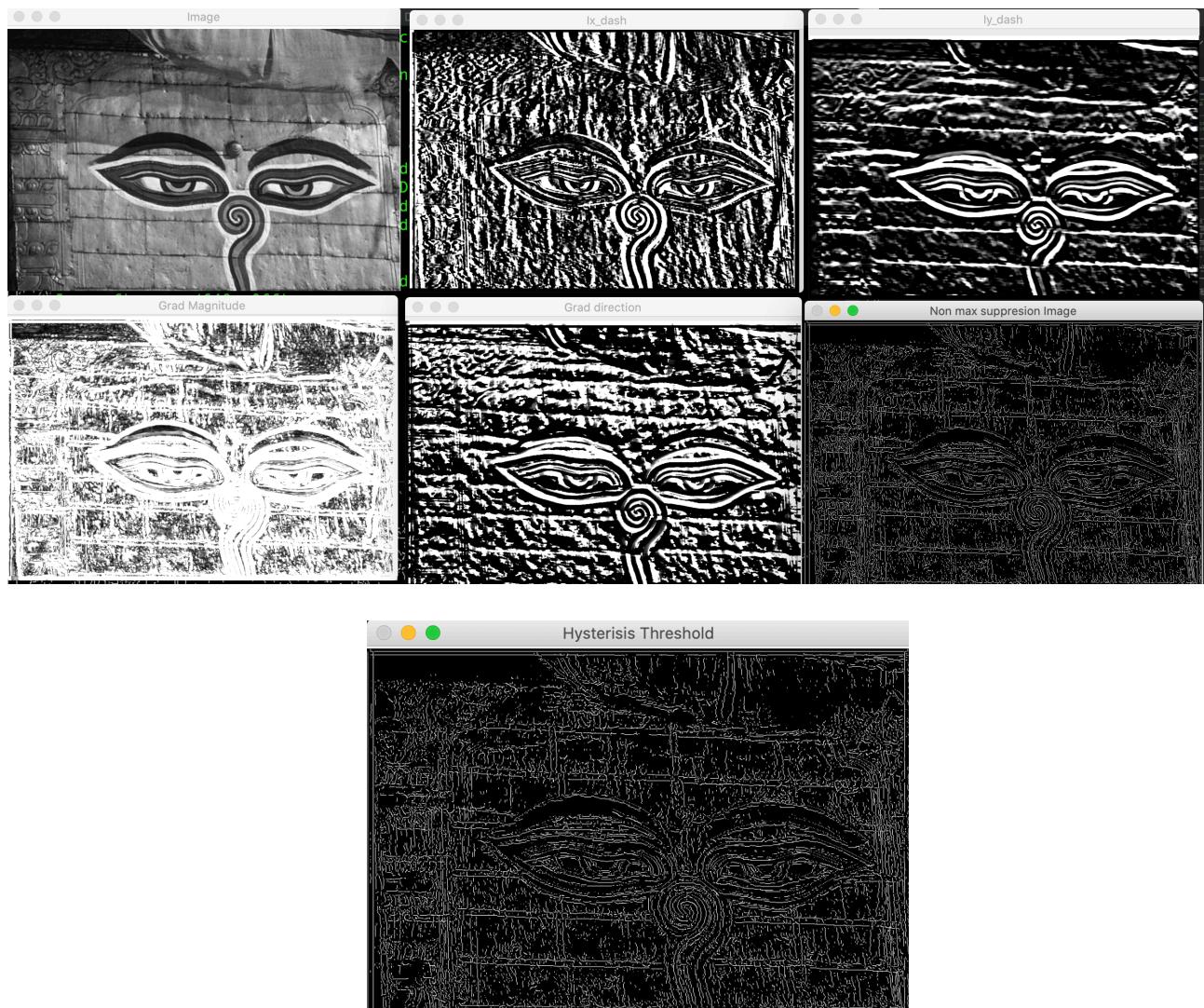
This work focused on implementation of Canny edge detection algorithm step wise. The main pipeline included the following steps

- a. Read grayscale image
- b. Perform gaussian smoothing using 1d filter with desired sigma and odd filter length first along x axis.
- c. Use same filter to perform gaussian smoothing on result from 2, along y axis, to get gaussian smooth image.
- d. Make a simple horizontal and vertical derivative mask, G_x and G_y , respectively.
- e. Compute gradient along x-axis using G_x , over the smooth image.
- f. Repeat along y-axis using G_y , over the smooth image.
- g. Compute gradient magnitude using results from e and f.
- h. Compute gradient direction using results from e and f.
- i. Apply non-max suppression on the gradient magnitude using gradient direction, to thin the edges.
- j. Apply hysteresis thresholding on the gradient magnitude or thin edges result from I, to get final edges.

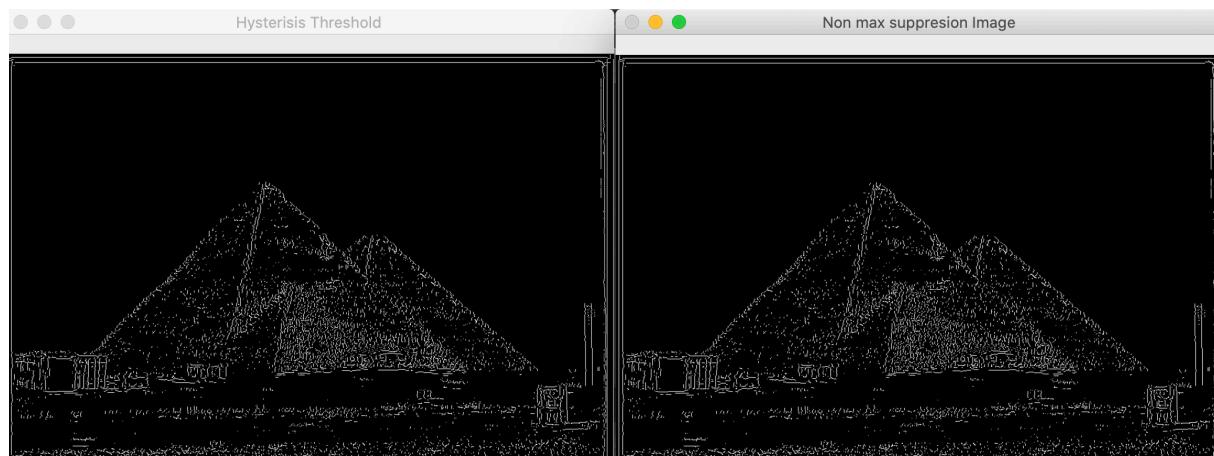
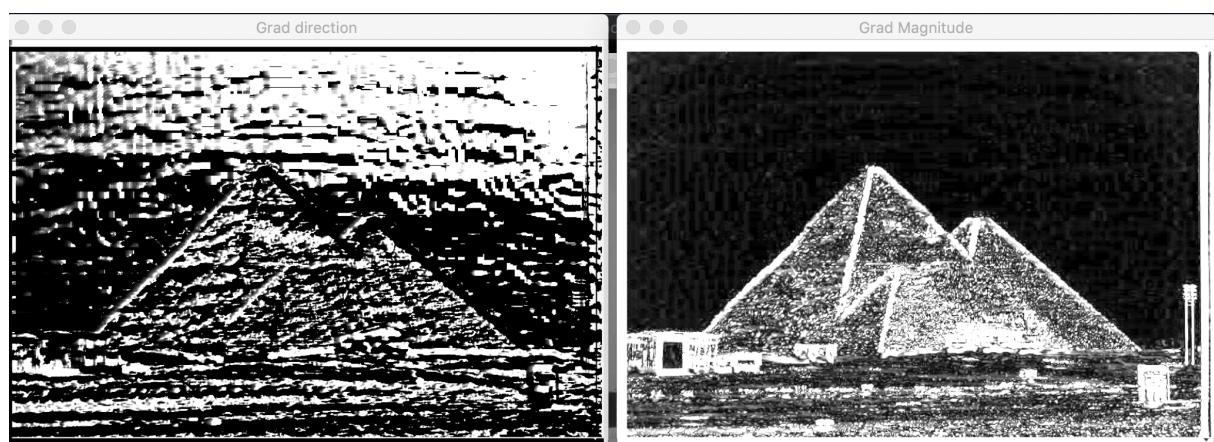
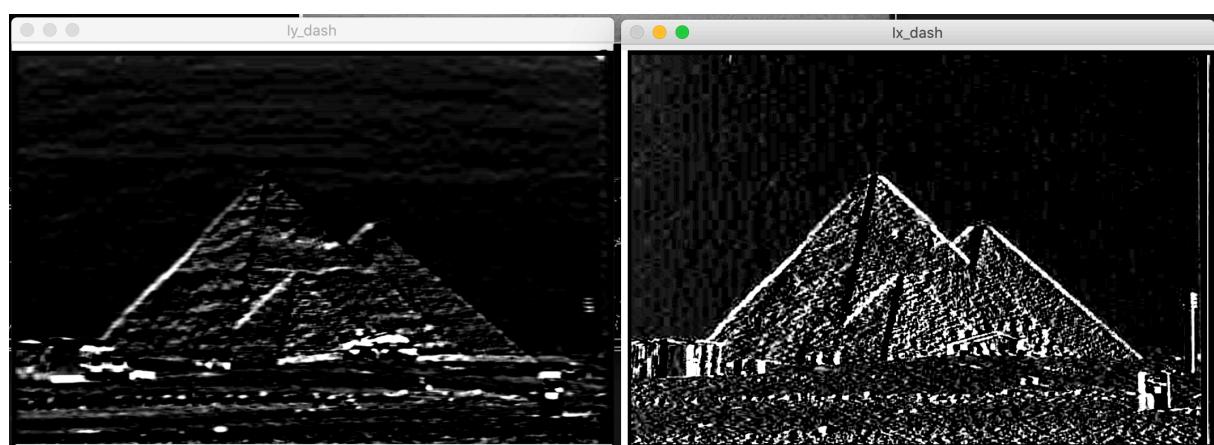
Result for Sample Image 1:



Sample Image 2:

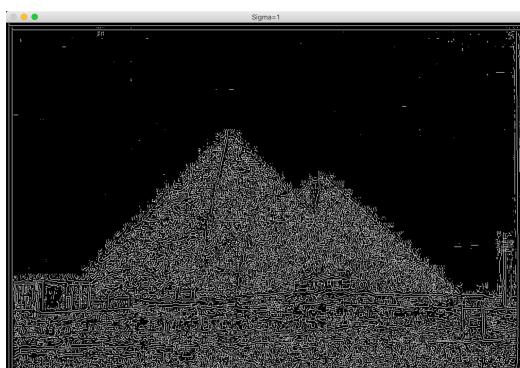
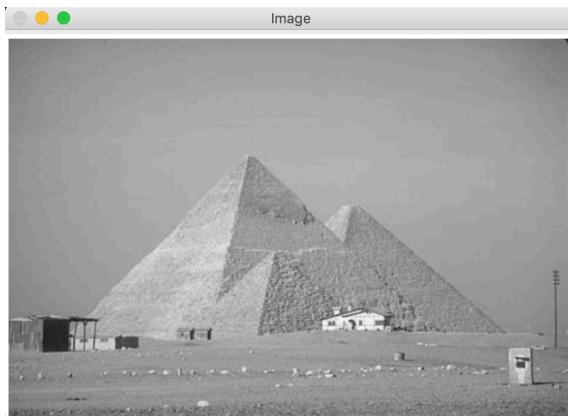


Sample Image 3:

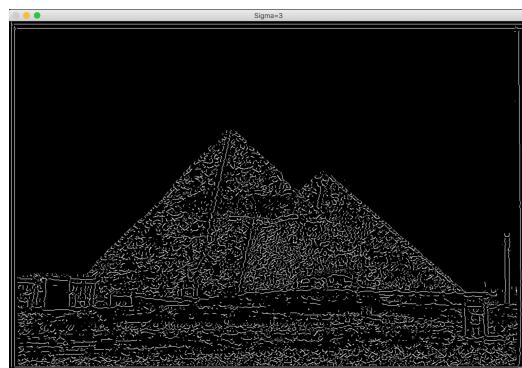


Effect of Sigma:

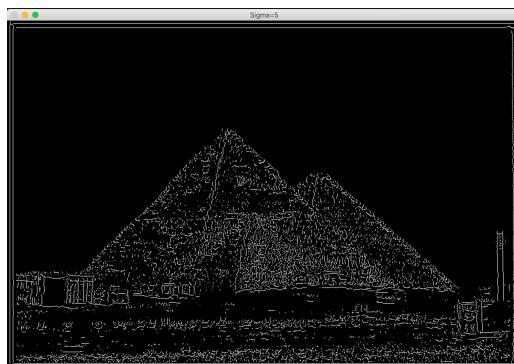
Increasing the sign makes the edges coarse.



Sigma=1



Sigma=3



Sigma=5