CS412 – OpenCV Homework 01

Thai Thien - 1351040

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1 How to use

- i - show original image
- w - save file as img.png into current directory
- s - smooth image. Drag the top bar to change the amount
- S - A better way to smooth image. Drag the top bar to change the amount
- G or g - turn image into grayscale.
- c - display image in green, red, blue
- x - Sobel filter in x direction
- y - Sobel filter in y direction
- M or m - display magnitude of gradient.
- p - plot the gradient vectors
- r - rotate mode. Drag the track bar to rotate the image.
- q - quit
- h - display this message on console

2 Display one channel of image

The matrix of jpg image have shape (height, width, channel). The third dimension are channel, which is green, red, blue for [:,:,0], [:,:,1], [:,:,2]

To display one channel of a source image create empty matrix have same shape with image matrix. Get channel c from source[:,:,c] then put into [:,:,c] of our matrix.

3 Convert to grayscale

Extract 3 channel from image. Then make new matrix shape(height, width) with each element is average of 3 channel from source image.

4 Smooth

Convolution source image with Gaussian kernel. Change sigma to change the amount of smooth.

5 Derivative filter

Convolution Sobel kernel with image.

6 Magnitude of the gradient

Compute x, y derivative of the image using Sobel kernel. Then calculate magnitude of gradient using cv2.magnitude

7 Plot gradient vector

As N increase, the number of line reduce. The shape of cat is clearer as N increase.

8 Rotation

Apply wrap affine to rotate image. Merge rotated image to old image so there is no hole.