

Image Processing for Computer Vision

by Mary Etokwudo

Edge detection on my personal photo

The submission is a folder containing some scripts which have different edge detection methods in them. There is one main script named "myCW3.m" which runs the functions from the other scripts to produce the images below.

1. Segmentation and edge detection:

Image 2 uses the "roberts" method for edge detection of the original image, after converting it to grayscale.

Image 3 uses a convolution mask for edge detection of the original image, after converting it to grayscale.

Image 4 uses HSV thresholds of the hue and saturation channels to segment the image, separating the face from the background. I used "improfile" to get the HSV thresholds for my face. Image 5 uses the segmented image 4 to do edge detection using "roberts" method. While image 6 uses sobel.

Image 7, after converting the original photo to grayscale, uses pixel thresholds to separate the face from the background. I used "improfile" to get the pixel thresholds for my skin color. Then I used the "imerode" to remove noise and "imdilate" to cover more face area.

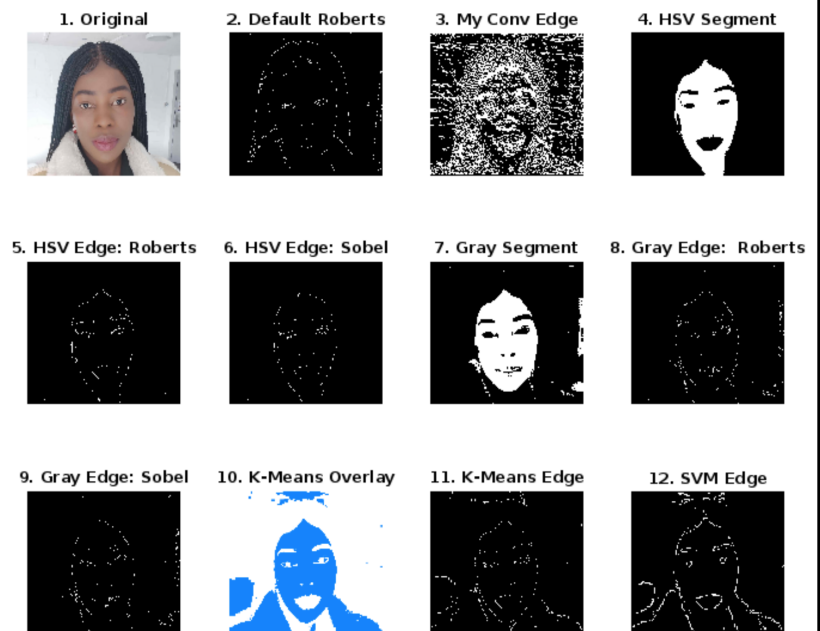


Image 8 uses the segmented image 7 to do edge detection using "roberts" method. While image 9 uses sobel.

Image 10, after converting the original photo to HSV, uses the "imsegkmeans" method to do a k-means segmentation of the image where k is 6. Then I got the mask of the first cluster and overlaid the mask on top of the rgb image.

Image 11 is the result of an edge detection of the overlay in image 10, using the "roberts" method.

Image 12, is the result of edge detection using SVM for segmentation. An SVM was trained and a 10-fold cross-validation was performed on it. Details on the complete process are in the matlab file.

Upon comparison, the k-means method produced better face detection than the SVM method. The k-means detected the jaws of the face but the SVM didn't. Also, the k-means runs faster than the SVM.

2. Draw initials on image:

This is the original image with my initials (M) written at the top left.
For the left vertical line: I set the red and green channels to zero to make a blue line.
For the right vertical line: I set the green channel to 255 to make a green line.
For the left diagonal line: I set the red channel to zero to combine green and blue to make cyan.
For the right diagonal line: I set all the rgb channels to zero to make black.
The image will be displayed on figure 2 when the main script is run.

