

Computer Vision Assignment-3 Report

March 19, 2021

Change in parameters of grab-cut segmentation algorithm and its effects

Change in number of Iterations for GMM and energy minimization

If the number of iterations of energy minimization are increased the segmentation becomes better. As the energy minimization algorithm runs more number of times and hence is able to come up with better segmentation (at each iteration the previous result's energy is minimized). From the two images of banana below you can see in **fig1** image has more incorrect labelings as compared to second **fig2**. One can notice the difference at the edges of the banana object.

Gamma Value

Gamma value according to the paper is described as the weight of the smoothness parameter in the energy function, i.e the weight of the distance metric between pixels. In the paper the gamma value was experimentally obtained to be 50 as the optimal value. Here in **Figure3** and **Figure5** one can see that if gamma is too low the smoothness is increased, this would imply that more background would be incorrectly labeled. But if the gamma is high the foreground may be incorrectly labeled. Hence it is important to choose the optimal value (50) in order to get the correct results.

Change in number of mixture components for GMM

Using the appropriate number of gmm components is important to get the correct results. The paper suggests 5 GMM components to be used. Changing the number of components shows bad results for fewer components (tested when gmm=3) and similar results for 5,10 GMM components. The number of components used must be able to capture the information in the foreground/background adequately.

Find the figures in **Fig 6, Fig 7, Fig 8**



Figure 1: Segmented Banana image after 1 iteration



Figure 2: Segmented Banana image after 4 iterations

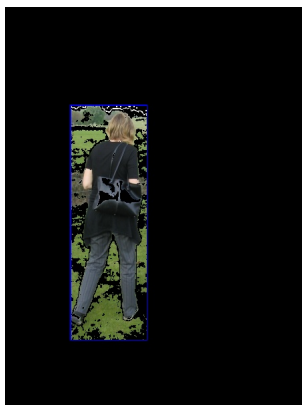


Figure 3: Segmented person image with gamma as 10



Figure 4: Segmented person image with gamma as 50

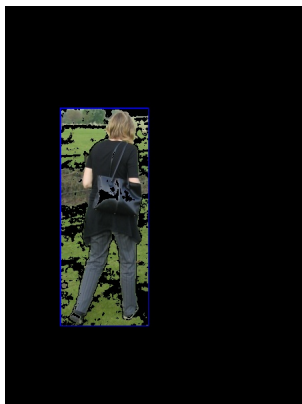


Figure 5: Segmented person image with gamma as 100



Figure 6: Segmented person image if teddy with number of gmm components 3



Figure 7: Segmented person image if teddy with number of gmm components 5



Figure 8: Segmented person image if teddy with number of gmm components 10