Visual Recognition

Image Segmentation

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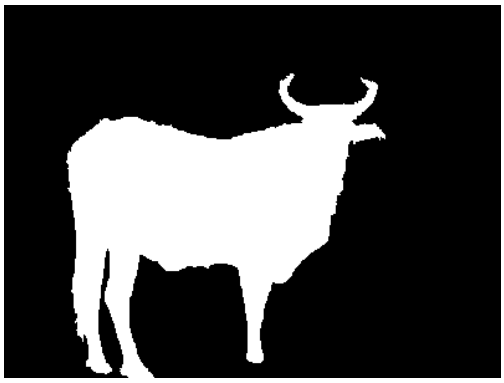
1. Task

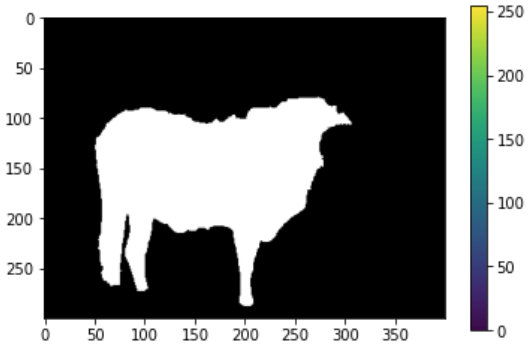
Given an image the algorithm should output the mask alone of the segmented object. For example,



2. OpenCV GrabCut

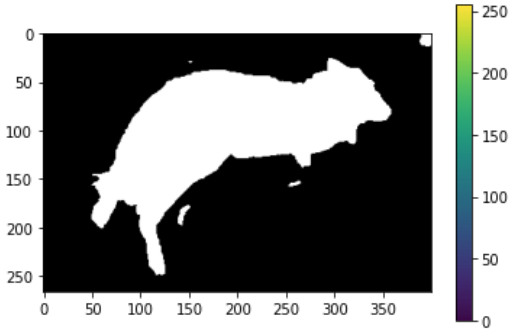
GrabCut is an image segmentation method based on graph cuts. Initially user draws a rectangle around the foreground region (foreground region should be completely inside the rectangle). Then algorithm segments it iteratively to get the best result. Done. But in some cases, the segmentation won't be fine, like, it may have marked some foreground region as background and vice versa. In that case, user need to do fine touch-ups. Just give some strokes on the images where some faulty results are there. Then in next iteration you get better result.

2.1 Image 1



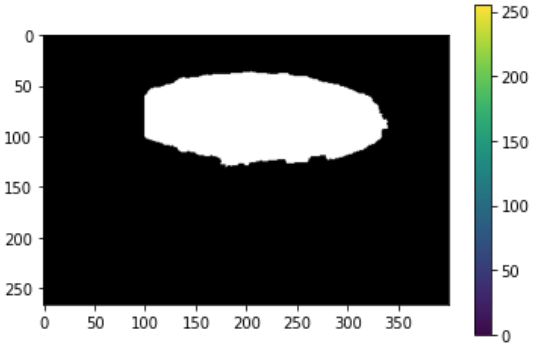
This image gave a DICE score of 0.9708 with the given ground truth image.

2.2 Image 2



GrabCut did good on the upper body. The lower body didn't turn out well by GrabCut.

2.3 Image 3



The image does not have the ground truth image, but we can say it is accurate by observing the image.

3. Other Techniques

3.1 Super-Pixel Methods

By using this method, the foreground and background regions could not be differentiated by me.

3.2 Spectral Clustering

I didn't use this method because the time taken to run for an image was too long.

4. Conclusion

By using GrabCut method, I got good segmentation result for images. So, using GrabCut method, the resulted images are reported in this report.

5. References

https://docs.opencv.org/3.4/d8/d83/tutorial_py_grabcut.html
https://learnopencv.com/faster-r-cnn-object-detection-with-pytorch/
https://ee.cooper.edu/~keene/assets/rafi_thesis.pdf
https://scikit-learn.org/stable/modules/generated/sklearn.cluster.SpectralClustering.html
https://towardsdatascience.com/spectral-clustering-aba2640c0d5b