2812ICT Lab week 9

Image segmentation

Various image segmentation algorithms have been discussed in this week's lecture. In this lab, we are going to experiment with two classical segmentation algorithms.

(1) K-means segmentation

Investigate the use of **cv2.kmeans()** for image segmentation.

(see https://docs.opencv.org/3.0-beta/doc/py_tutorials/py_ml/py_kmeans/py_kmeans_opencv/py_kmeans_opencv.html)

The tutorial in this link uses k-means for color quantization (https://docs.opencv.org/3.1.0/d1/d5c/tutorial_py_kmeans_opencv.html). Note that if we assigned a label to each color, we are effectively performing segmentation!

Experiment with k-means segmentation (with different *k*) and report your finding.

(2) Otsu's binary segmentation

Implement Otsu's binary segmentation algorithm using the fast algorithm given in slide #13.

Run your segmentation code on the Sudoku image provided.

(a) How good is the segmentation? Discuss

(b) Could you find a suitable threshold through trial and error to get a good binary segmentation for this image? Show some experimental results.

(c) Show how you could modify the Otsu binary segmentation algorithm to obtain a good segmentation for this image. Show your results. (Hint: modify your code to compute a localized threshold value over a local window)

Prepare a report describing your work and experimental results obtained.

What to hand in:

Use the link provided on L@G to hand in your work by the end of the week. Programming work should be done in Python, using Jupyter notebook¸ for code, results, and documentation. If you are using Jupyter notebook, submit your results based on a html file.