

Color Practice. Image Segmentation

The K-means algorithm

k-means clustering aims to partition n observations into k clusters in which each observation belongs to the cluster with the nearest mean, serving as a prototype of the cluster. This results in a partitioning of the data space into Voronoi cells.

The exercise demands that you implement your own algorithm for k_means clustering algorithm.

1. Use the k-means algorithm to segment the 'papillary_carciroma.png' image (fig. 1) in the RGB color space. The idea is to locate the bluer areas corresponding to cells reacting to the *Alcian blue* colorant. Ideally the bluer areas must be segmented in separated compact regions (use morphology after pixel segmentation).
2. Try to segment the same image in the HSL and HSV color spaces, using k-means too. Comment how have you treated those pixels near white and black colors. Also those with a very low saturation. Comment how have you dealt with the cyclicity of the hue component.
3. Finally use the Lab color space. Does this space help to deal with the issues of HSL/HSV color spaces?

Compare the results of the segmentation in the different color spaces. Try different number of clusters.

Test your results using the different color spaces in a new set of images: tucan1, peppers, flowers, ... (without trying to segment specific compact areas).

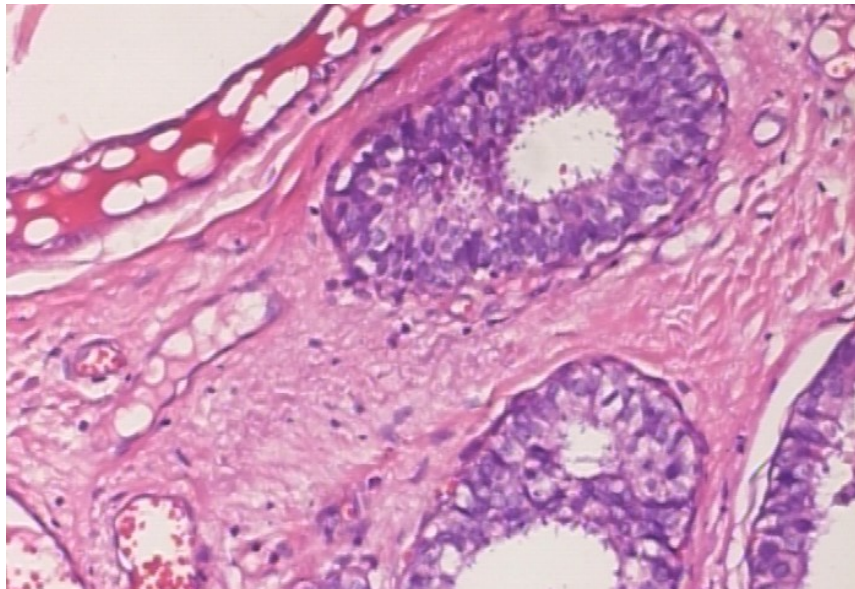


Figure 1. papillary_carciroma.png image