

## B657 - Assignment 3

**Due: Tuesday January 29 before class.**

The purpose of this assignment is to implement K-means clustering algorithm and apply it to image segmentation. The images you should work with can be accessed here:

<http://www.indiana.edu/~dll/B657/horse.jpg>

<http://www.indiana.edu/~dll/B657/fruits.jpg>

<http://www.indiana.edu/~dll/B657/frog.jpg>

<http://www.indiana.edu/~dll/B657/girl.jpg>

You are to implement the following two or three functions:

1. [imageOut] = imseg\_kmeans1(imageFile, k). This function outputs a segmented image based on K-means clustering on the 3D color space. The pixels in the same segment should be rendered with the same [r g b] values corresponding to the center of the cluster.
2. [imageOut] = imseg\_kmeans2(imageFile, k). This function is the same with the above one except that you will apply K-means on a 5-dimensional space [r g b x y]. In this way, the segmentation algorithm takes advantage of spatial information as well as color information.
3. (bonus) [imageOut] = imseg\_kmeans3(imageFile, k). Develop your own segmentation program that can do a better job than the above two functions.
4. Report your results including
  - a. How well your code works on each image sample.
  - b. Comparison of different approaches.
  - c. Discussion on how to improve your results if they are not perfect.

You will hand in your Matlab code and report. You will need to zip/tar/rar all the files into one with the name B657\_(hw #)\_(your last name).zip(or tgz/rar), and send it to [chenyu@indiana.edu](mailto:chenyu@indiana.edu).