Quiz #2 (5%)

Part I: Multiple-choice questions

Part I: Multiple choice questions, choose one correct answer.

1. Which of the following actions is often applied to eliminate aliasing?
a. Low-pass filtering. b. High-pass filtering.
c. Better focusing. d. PCA.

2. If you are unsure of how many clusters you have in your data, the best method to use to cluster your data would be:
a. Mean-shift. b. k-means.
c. Expectation-maximization. d. Markov random field.

3. Normalized cuts is an NP-hard problem. To get around this problem, we do the following:
a. Apply k-means as an initialization. b. Force the affinities to be positive.
c. Limit the number of cuts we make. d. None of the above.

4. To decrease the size of an input image with minimal content loss, we should:
a. Crop the image. b. Apply a Hough transform.
c. Apply a low-pass filter and down-sample the image d. Apply a high-pass filter.

5. In which of the following scenarios can you use a weak perspective camera model for the target object?
a. A squirrel passing quickly in front of you. b. An airplane at a high altitude.
c. Taking a photo of the Hoover tower right in front of it. d. A car beside you when driving.

Part II: Problem-solving question

One of the benefits to the RANSAC method is that we are able to calculate the failure rate for a given number of samples. Suppose we know that 25% of our data is outliers. How many times do we need to sample to assure with probability 25% that we have at least one sample being all inliers? Hint: You can leave your answer in terms of log functions.

Part III: Software practice

Take a color photo of an item placed on your desk. Convert the obtained color image to a grayscale image. Perform the following tasks with imported Python libraries using the grayscale image:
1. Perform direct Fourier transform onto the grayscale image. Apply a low-pass spectral filter.
2. Perform inverse Fourier transform onto the modified spectrum and compare the original and modified images.
Note: The software practice files (including .py files, Spyder screenshots, and initial and processed images) have to be submitted in a ZIP file by e-mail to dbatovski@au.edu.