TOTAL GRADE: _____

CAP 4453 - Robot Vision (2021/Spring)

Midterm Exam Practice

(5 Questions, Total Time allowed: 15 Minutes,
Each question is 5 point)

In the mid-term, you will have 20 Questions, Total Time allowed: 75 Minutes,
Each question is 5 point

Name:
Last Name:
Student ID:

Q.1	We discussed matrix multiplication in Lecture 2. In one of the interpretations, we saw that any matrix multiplication (AxB) can be represented as a linear combination of columns of A which gives you columns of the resultant matrix. This representation is also true for columns of B and we can get columns of the resultant matrix by taking linear combinations of columns of B. True/False False
Q.2	In HOG descriptor, when we compute the histogram of orientation for each cell, the magnitude of gradient is used as a vote and each orientation will always go into one of the bins. True/False False The orientation is used to determine the vote and each magnitude can go into multiple bins
Q.3	In one or two sentences, please explain why we often need "multi-scale" approaches in computer vision, particularly in keypoint estimation? Multi-scale approach allows to compute features for images at various scales, which enables focusing at different type of features for different scales. For smaller scales, it can focus on only major keypoints while for larger scales it can focus on major as well as minor keypoints. This also helps in changing the area of interest for the same size kernel: a 3x3 kernel for small scale will cover more context of the image while for large scale it can only cover very small neighborhood. All of these help with gathering different types of information from the image, which ultimately helps in downstream tasks such as classification or detection.

Q.4	What will be the order of the following steps for Canny edge detection? - Find magnitude 3 - Find orientation 4 - Thresholding 6 - Image smoothing 1 - Non-max suppression 5 - Compute derivative 2
Q.5	Which of the following are methods for image segmentation? Mark all those apply [multiple options maybe true] 1 - Otsu True 2 - Binarization True 3 - SLIC True 4 - Region merging True 5 - Sobel