Notebook 3 Quiz

Started: Nov 14 at 5:49pm

Quiz Instructions

This quiz will review the topics presented in the exercises from the third notebook on feature keypoints, descriptors, and applications. The quiz is open book/notes/resources. You will have 60 minutes to complete the quiz.

Read the questions carefully. There are multiple variants of each question, and they may change slightly between each attempt.

Question 1 — 1 pts

Use the arrays Ix and Iy shown below to calculate the value of R for the center pixel. Assume that the 3x3 weighting matrix $w(x,y) = 1$ for all x and y, and $\alpha = 0.05$. Recall:

$$M = \sum_x \sum_y w(x,y) \begin{bmatrix} I_x^2 & I_x I_y \\ I_x I_y & I_y^2 \end{bmatrix}$$

$$R = \det(M) - \alpha \, \mathrm{trace}^2(M)$$

```
Ix = [[0 1 1]
      [1 0 1]
      [0 1 0]]

Iy = [[0 1 0]
      [1 0 1]
      [1 1 0]]
```

Enter your answer to one decimal place accuracy, e.g., for a value of 3.14159 enter 3.1; for a value of 2 enter 2.0.

Question 2 — 1 pts

Given the 2x2 magnitude array and a 2x2 angle array (values in degrees) for a cell shown below, use 4 **unsigned** angle bins [0-45), [45-90), [90-135), and [135-180) as

shown in the notebook to calculate the cell histogram.

```
Magnitudes:
[[ 9  2]
 [ 1  6]]

Angles:
[[  11  353]
 [ 131  271]]
```

What is the magnitude of the histogram for the [90-135) angle bin?

10

Question 3 1 pts

According to the HoG paper by Dalal & Triggs, which derivative masks work **best** for human recognition with HoG?

- ○ uncentered (i.e., mask = [-1, 1])
- ◉ centered (i.e., mask = [-1, 0, 1])
- ○ Sobel
- ○ diagonal (i.e., mask = [[-1, 0], [0, 1]])

Question 4 1 pts

Given a 128x64 image window, calculate the size of the HoG feature vector that will be computed with 9 angle bins using a 3x3 block shape and 8x8 cell shape.

6,804

Question 5 1 pts

What is the default feature detector & descriptor used by OpenSfM?

- ○ SIFT
- ○ SURF
- ○ ORB
- ○ HoG
- ◉ HAHoG

Quiz saved at 6:29pm Submit Quiz