Name: _____

Score: /11

CSE 5524 Computer Vision for HCI AU'22

Homework Assignment #8

Due: Tuesday 10/25

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1) Compute and display the Harris pixel-wise cornerness function R values for the image checker.jpg using a) Gaussian window/weighting function with a standard deviation of $\sigma_I = 1$ (use 3σ mask size), b) Gaussian Gx,Gy gradients with a standard deviation of $\sigma_D = 0.7$ (use 3σ mask size), and c) trace weighting factor of $\alpha = 0.05$. (For this assignment, use the Gaussian smoothing and derivative formulas given earlier in class, and normalize the sum of the smoothing mask to 1 and the sum of the abs derivative masks to 1.) Give the values of R(17:23, 17:23) in your report (these coordinates are for Matlab indices, so subtract 1 if using Python).

   Note: use double() and not im2double() in your Matlab code (as it scales values to 0-1) on checker.jpg.

   Next remove the *smaller* (and negative) values in R (anything < 1,000,000). Display the thresholded R using imagesc (stretches values to the min/max display graylevel).

   Lastly, do a simple non-maximum suppression on R to identify the actual corner points and display them on the original image. For this version, keep a location only if it is a unique maximum in its 3x3 region. [5 pts]

2) Implement the FAST feature point detector using a radius of $r = 3$ (you can hardcode the particular circle border locations), intensity threshold of $T = 10$, and a consecutive-number-of-points threshold of $n^* = 9$. Run the detector on the image tower.png. Display the image and overlay the FAST feature points. Repeat with T = {20, 30, 50} and compare all four results. [6 pts]

```
figure;
imshow(tower);
hold on;
plot(fastX,fastY,'r.');
hold off;
```

3) As usual, turn in and upload your material.