Computer Vision Homework 6 README

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Challenge 1a worked fine.

I used a manual way (a line of formula) to transform an RGB image to a grayscale one, although I think MATLAB should use the same algorithm as well.

For the focus measure, I used the method of integral image to help me save time. For an m x n 2D array, I first pad around the image/matrix with zeros and they have a width of (half_window + 1). This is to avoid the case when the sliding Laplacian window is out of range. Then, I perform the integral image technique from lecture slides and compute a matrix with sums. I wrote a function called integralImage() to help me do the calculation separately. The function also saved more time because it performed 3D matrix calculation which just do all calculations for all images together.

After that, I dynamically managed two matrices called all_measure and index_map for results. The first matrix has the largest current focus measure for each pixel, and the second matrix has their corresponding indexes.

Finally, one can get the result in less than 10 seconds.

Challenge 1b worked fine.

I used a while loop to continuously check for inputs. If the input is out of scope (out of the image), the clicked pixel should has invalid coordinates and then the while loop will be terminated.

I learned from Ed discussions to use a loose border around images to create space for user to exit the program.

All files, original or generated, are included in the zip file.