EE 146 COMPUTER VISION

Department of Electrical & Computer Engineering
University of California at Riverside
Tues., Thurs. 3:30 - 4:50pm, Online Class, WCH 142, Winter Quarter 2022
Labs Wed 8:00 --10:50am, Online; Thurs. 11:00 -- 1:50pm, Online

EE 146 Lab 7, February 16 & 17, 2022

Goal: Learn the basic concepts for matching gray scale and binary images (Chapter 23 book)

Problem 1: Template matching for gray scale images

You are given a gray scale image and a template image. Perform template matching using local cross-correlation and normalized local cross-correlation to find all the instances of the template in the image.

(a) Report your results by showing the results of cross-correlation and normalized cross-correlation and finding the instances of the template by thresholding the cross-correlation results.
(b) Now your template's intensity has changed but the image intensity remains the same as before in (a). Compare the new results with the results obtained in (a).
(c) Now your template's intensity remains the same as in (a) but the image intensity has changed. Compare the results with those obtained in (a) and (b).
(d) Now the intensity of both the image and template has changed. Compare the results with what you obtained in (a), (b) and (c).
(e) Now the image is the same as in (a) but the template has been rotated by 90 degrees. Evaluate the effect of rotation on the performance of detection by template matching.

Problem 2: Distance Transform and Chamfer Matching for binary images

(a) You are given a binary template and a binary image. Your task is to locate all instances of the template in the image. Perform a direct comparison (local cross correlation) of binary images to find the template and measure the computation time.
(b) Compute the distance transform of the binary image in (a) using the chamfer algorithm. Measure the computation time.
(c) Now perform matching of binary template and binary image in (a) using Chamfer matching algorithm using distance transform as computed in (b). Measure the computation time in (c). Compare the results and the total computation time in (b) and (c) to that obtained in (a). What did you learn with this comparison?