CSE 473/573 Project 1 Report – Saeyeon Hwang

Part1) Enrollment – how to extract features

1. Extracted two data – test_img, characters
2. Why we extracted test_img: to use in detection, made the image to binary image. If values are over 127, they are converted to 255. If they are under 127, they are converted to 0.
3. Characters – First, using loop, converted 2d array to 3d array. Second, applied canny edges to extract features. Before using canny detectors, converted color to grayscale, and applied image binarization
4. In OCR function, using loop, I saved each characters' features.

Part2) Detection – how to extract individual characters from the test_img

1. Implement Connected Component Labeling. – The process is divided into 2 passes.
2. Preprocessing – need to restrict inputs to binary images. Done at enrollment part. The background pixels are be labelled '255'(white). And the labelled image, the background pixels will be labelled '0'
3. First pass – using if-else, pass if test_img pixels are background. If test_img pixels are foreground, that means we have characters' pixels. Because we used 4-connectivity, there would be 4 cases. First, no neighbors at left and right, only neighbor at left, only neighbor at top, and multiple neighbors.
4. Second pass – In second pass, we must handle inconsistencies. We must fix labeling error, which were same components, but recognized as 2 separate components. By using loop and conditional statements, if index of matrix is not out of bound, test_img is foreground, pixels are same with right pixels, but labeled image's pixels are not same, I updated labeled_img pixels to the lowest, equivalent label.

Part3) Recognition – what methodology is used to match the enrolled characters to the characters

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