Date: 03-09-2021

CSE-573 Project 1 - Report

Enrollment: Enrollment of the 5 characters has been done in the following sequence:

1. The paddings are removed from each sides of the images.
2. Extracting the edge features of the characters using Canny Edge detection.
3. The detected edges are saved for later use during recognition.

Detection: In this part, we process the image on which the characters has to be recognized. The following sequence is followed:

1. Identifying the background
2. Implementation of Connected component labelling:
   a) First find out connected component going row-by-row and looking for neighbors in west and north direction of the current pixel. Giving unique label to each detected component.
   b) Now look for the neighbors which have been left out because they were not connected directly. For example:

      [[0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]

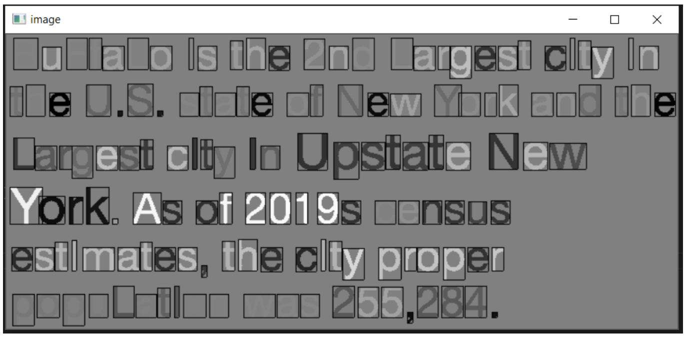
      [0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0]

      [0 0 0 0 0 0 0 0 0 2 2 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0]

      [0 0 0 0 0 0 0 0 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0]

      The labels 2 and 3 belong to same components but are fixed after second pass.

   c) Find Bounding box of each connected component by find [xmin, ymin, xmax, ymax] and finally finding height and width of the bounding box.



   d) Extracting each element from the original test_image and appending into a list.
   e) Returning a list of labelled characters separated from single source image and bounding box information.

Recognition:

1. Each template is scaled to the resolution of the target image.
2. The templates are matched using SSD.
3. The character with minimum error is considered as the closest to match.
4. If the min error is able to qualify the threshold it is said to be recognized.

OCR:

The results are appended into the list following the format as shown in the problem statement.

Conclusion:

1. With the usage of SSD for matching the F1 measure as returned by evaluate.py is **0.50**

2. However, if we simply add up the error, we are able to see the F1 measure as returned by evaluate.py is **0.7575**

```
C:\Users\jmudi\Documents\AA Spring 2021\CV CSE573\project 1\Project1(3)\Project1>python evaluate.py --preds results.json --groundtruth ./data/groundtruth.json
0.7575757575757576
```