Assignment 2 Report

Kexin Ding

1. Problem Description

In this task, we try to develop an auto-cropping algorithm. The cropped region is a paper in any position of the image. The background can be clean or messy, and the paper can be large or small. In the final result, we try to get the coordinate of the top-left point and the cropping region width and height.

2. Detailed Solution

The main idea of my solution is the background and foreground segmentation. I understand the paper(the region needs to be cropped) as the foreground and other areas are the background. I used the following method in my experiment:

(1) Dilation: expand or thicken foreground objects in an image.

(2) Erosion: expand the background objects in an image. Removing islands and small objects so that only substantive objects remain.

(3) OTSU: a thresholding algorithm. The algorithm returns a single intensity threshold that separates pixels into two classes, foreground, and background. The returned image is a binary image. The background pixels will be assigned to 0, and foreground pixels will be assigned to 1.

(4) Detect the top-front point

3. Result and analysis

This is the best result I got is 38 points/50 points.

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Image[25] - Percent Overlap[88.8] - Final Score[38.00] - Time[52.753 sec]
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Some difficulties in my experiment:

1. Background: some images have a messy background(Like stripe or color is similar to the paper). In those images, my method is challenging to show a better result. But in those have a clean background, my approach can show an outstanding result.

2. Find the “White region” in Binary image: after using OTSU, we will get a binary image. Ideally, The black region represents the background, and the white area represents the foreground. But the real situation is some small patch should be background, but they are detected as foreground. Hence when I find the white region, those wrong white regions will disturb me a lot.