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ECE 332

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MP 1 Report

INTRODUCTION

In this MP, I implement the algorithm CCL to divide the given pic into different parts with different grayscale colors.

In order to do so, I used an algorithm named TWO-PASS, which is commonly used in the connected region analysis algorithm, which refers to scanning the image twice to find and mark all the connected regions in the image.

ALGORITHM

Preparation:

Before the two-pass algorithm, we need to first make sure our image is a binary image, which means every pixel should either be 0 or 255.

FIRST-PASS:

Traverse the pixel points from the upper left corner, find the point where the first pixel is 255, and set the label to 1 of the pixel.

When the left neighbor pixel and the upper neighbor pixel of the pixel are invalid values, set its left and upper pixel label to 0.

When the left adjacent pixel or the upper adjacent pixel of the pixel has a valid value, assign the label of the valid value pixel to the label value of the pixel;

When both the left neighbor pixel and the upper neighbor pixel of the pixel are valid values, select the smaller label value and assign it to the label value of the pixel.

SECOND-PASS:

Update the label of each point to the smallest(root) label in its set.

If they are the same, they belong to the same part, if not, add a new part.

After:

(only for gun.jpg):

Create a filter which can erase out non-connected small parts.

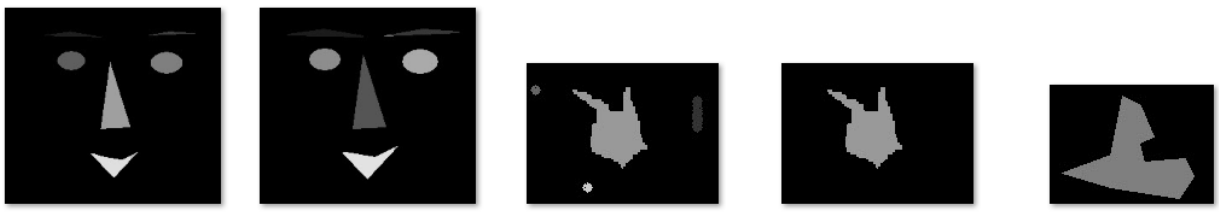
Move the filter along each pixel to see if it covers all pixels of that part, if it is, then set this part to 0, if not, then keep this part.

Collect all segment parts of this image and assign a color to each part.

Print out the number of parts if needed.

RESULT ANALYSIS

As shown in the submitted graphs, there are 5 pictures in total. Four of them are tested images and one of them is under the filter process. In each pic, every part which has no connected pixels are separated into different grayscale colors. In gun_filter pic, since our filter covers all pixels of



the three spots on the original pic, our result pic under filter process changes these pixels to 0 and shows only the gun without any interference.