MSAI 495 Introduction to Computer Vision - Assignment 1
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Connect Component Labeling

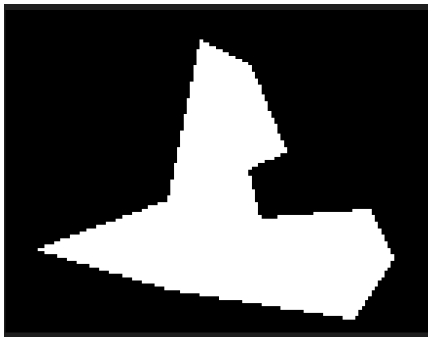
Algorithms Used:

1. For clustering pixels into groups from the raw image data:
    A. Scan the image pixel by pixel.
    B. If a pixel is white (foreground), check its top and left neighbors.
    C. Assign a label [First pass over the image data]
        D. If both neighbors are background (black), assign a new label.
        E. If one neighbor has a label, copy it.
        F. If both neighbors have different labels, assign one and record that the two labels are equivalent.
    G. [Second pass over the image data] After scanning the whole image, update labels to make sure all equivalent labels are merged into the same group.

2. For filtering out groups based to cluster size to remove noise:
    A. Count how many pixels are in each group.
    B. Set a size threshold.
    C. If a group has fewer pixels than the threshold, remove it by removing the group labels from the dictionary.

Results:

1. test.bmp



2. face.bmp


3. Face_old.bmp [The first image is unfiltered, where u could see 4 patches in the eye and mouth region, with different colors. After filtering with the size of 50, all of them became background.]


4. Gun.bmp [1: raw img 2: unfiltered img 3: img with 50 filter size 4: img with 500 filter size]