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Homework 0

 This report provides an outlook on using Matlab to explore color-based segmentation and the counting of objects. During the first assignment, I used functions such as medfilt2 to take away noise on the image. In order to count the number of objects I utilized the image processing functions such as im2bw to create a B&W version of the original image and bwlabel to distinguish objects. I used LAB functions in combination with functions already mentioned in order to find objects based on color.

3.1 Denoise Image

The first thing I did to approach this assignment was to smooth out the image.
I did this by first separating out the red, green, and blue color planes of the pin image. Then I applied medfilt2 to each to each individual color plane. Then I compiled all the filtered image layers into a new image file "filtPins" (figure 1).

Figure 1

3.2 Finding the total number of colored objects

My approach to counting the total number of pins is based on the *" Color Segmentation with Live Image Acquisition"* video provide to us via piazza. First, I converted the filtered image of the pins into a doubly precise version of the image. Then I extracted the color threshold from each of the color layers. After that, I converted every color layer to B&W using im2bw. Then using imcomplement, I compiled all three layers together to make a complete B&W image of the pins (figure 2). Next, I used morphological operation imfill to fill in all the empty holes in the image (figure 3). Once that was complete, I used bwlabel to find all the individual objects in the image. Then I printed the number of pins by displaying the numlabels variable from the matrix provided by bwlabel. In addition, I placed a red box around all the pins using region props bounding box and the rectangle function (figure 4).
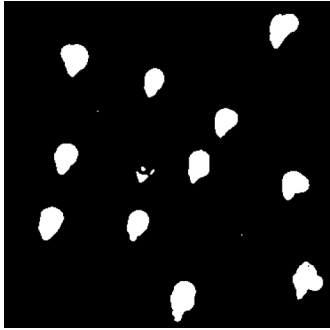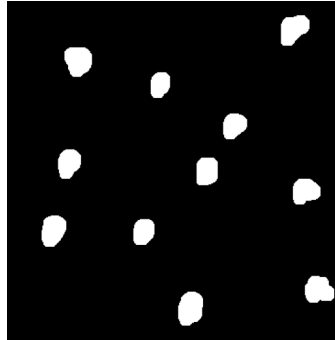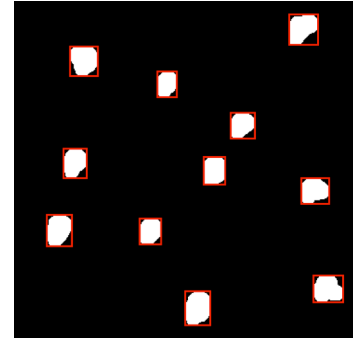
Figure 2

Figure 3

Figure 4

3.3 Finding Individual colored objects

My approach to finding individual colored objects is based on the *" Color Segmentation with Live Image Acquisition"* video provide to us via piazza. In order to compare the colors of the objects I first found the median color of all the pins. By constructing a for loop and finding the median color across all three-color planes. At the end of the loop I re concatenate all the color planes to see the median value of all the color pins (figure 5). Then I used ginput(1) in order to select the colored pin I would want to use to find pins of the same color. Then stored the color of the pin I had just selected. Next, I converted the RGB space to LAB color space using the makecform and applycform commands. Next I found similarly colored objects by finding the Euclidean distance between the color values using the hypotenuse formula. Then I stored information about the objects that were close in color into a separate variable (figure 6). Then I converted that variable into B&W in order to label all objects (figure 7). Then using regionprops with bounding box I created a for loop that placed colored boxed around each of the objects of matching color. I repeated this process three more times for the other colors (figure 8).
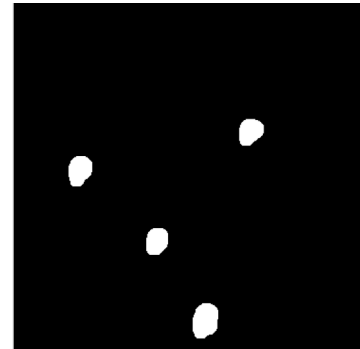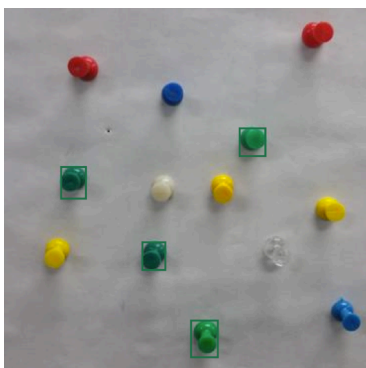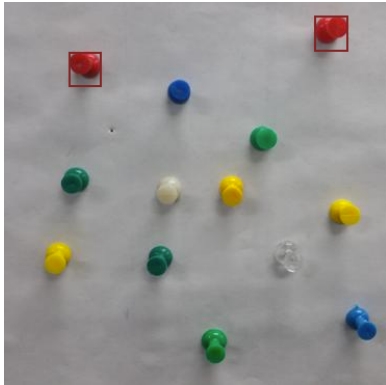

Figure 5

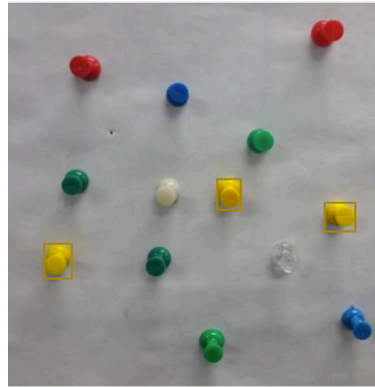
Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

Figure 11