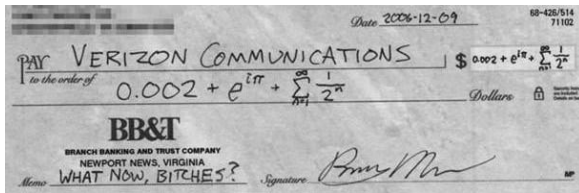# Activity 7 - Image Segmentation
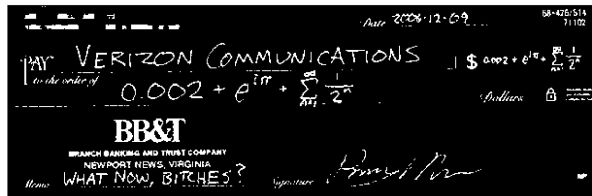
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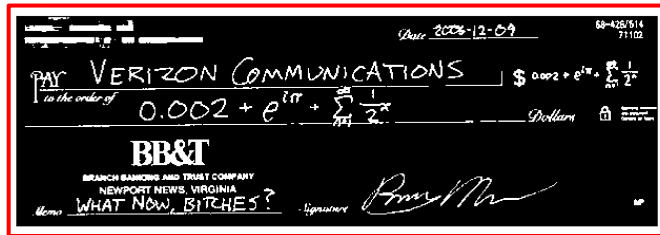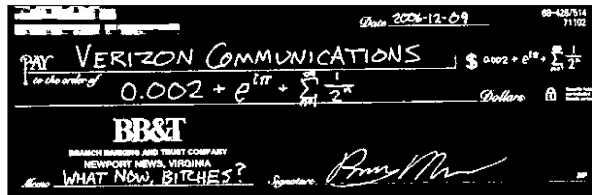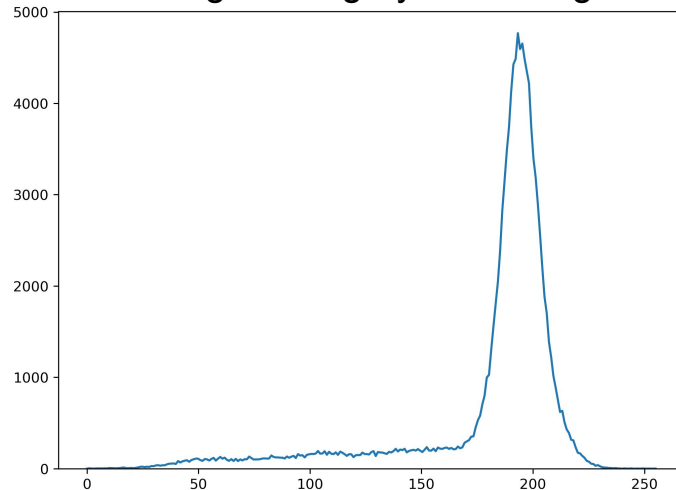
Image segmentation of a grayscale image

original

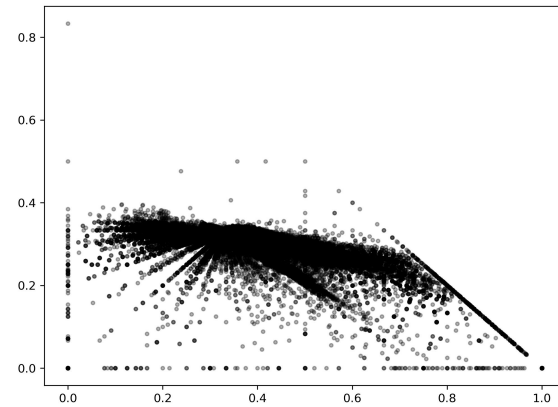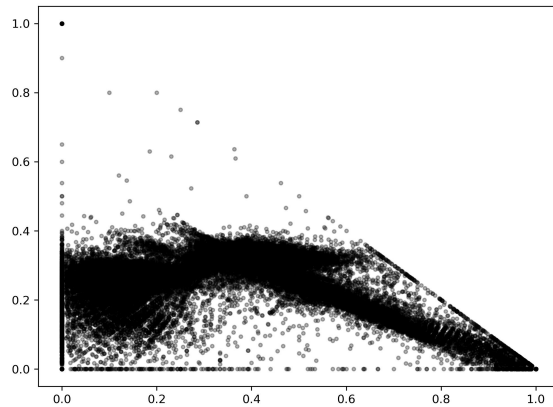threshold = 100

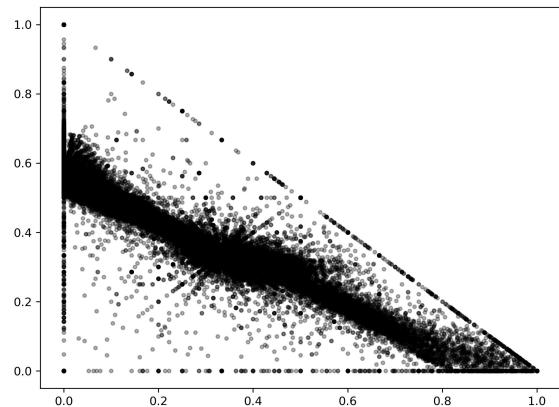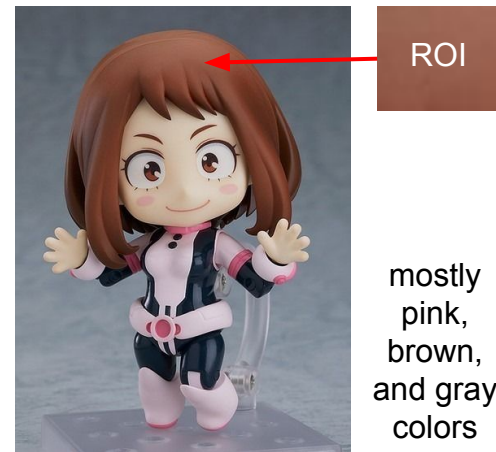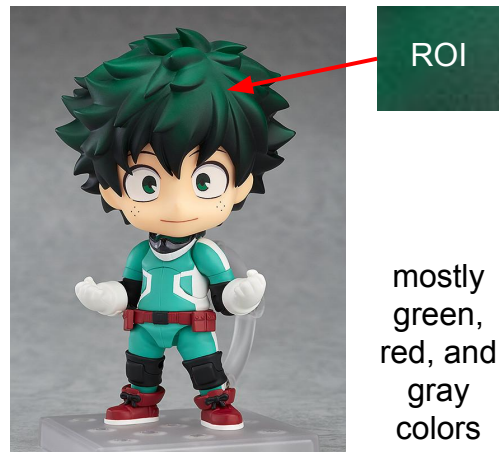threshold = 125

threshold = 150
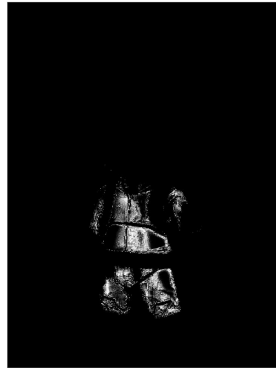
histogram of grayscale image

All values less than the threshold are displayed in the segmented image. The peak in the histogram corresponds to the paper background, since it occupies the most space.

Plotting images in normalized chromaticity space

mostly green, red, and gray colors

mostly blue, red and gray colors

mostly pink, brown, and gray colors

Parametric Segmentation
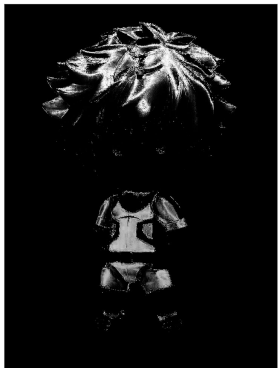
Parametric segmentation was able to segment most of the region of interest. There are gaps where the color has a lower or higher intensity than the cropped ROI. This is evident especially in the hair where the ambient light reflects on the toy.
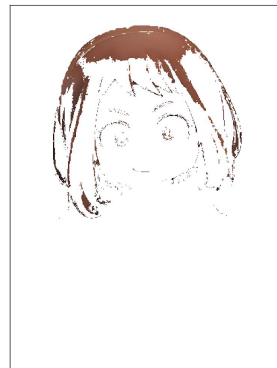
Nonparametric Segmentation 2D histograms of patches

green patch

blue patch

brown patch

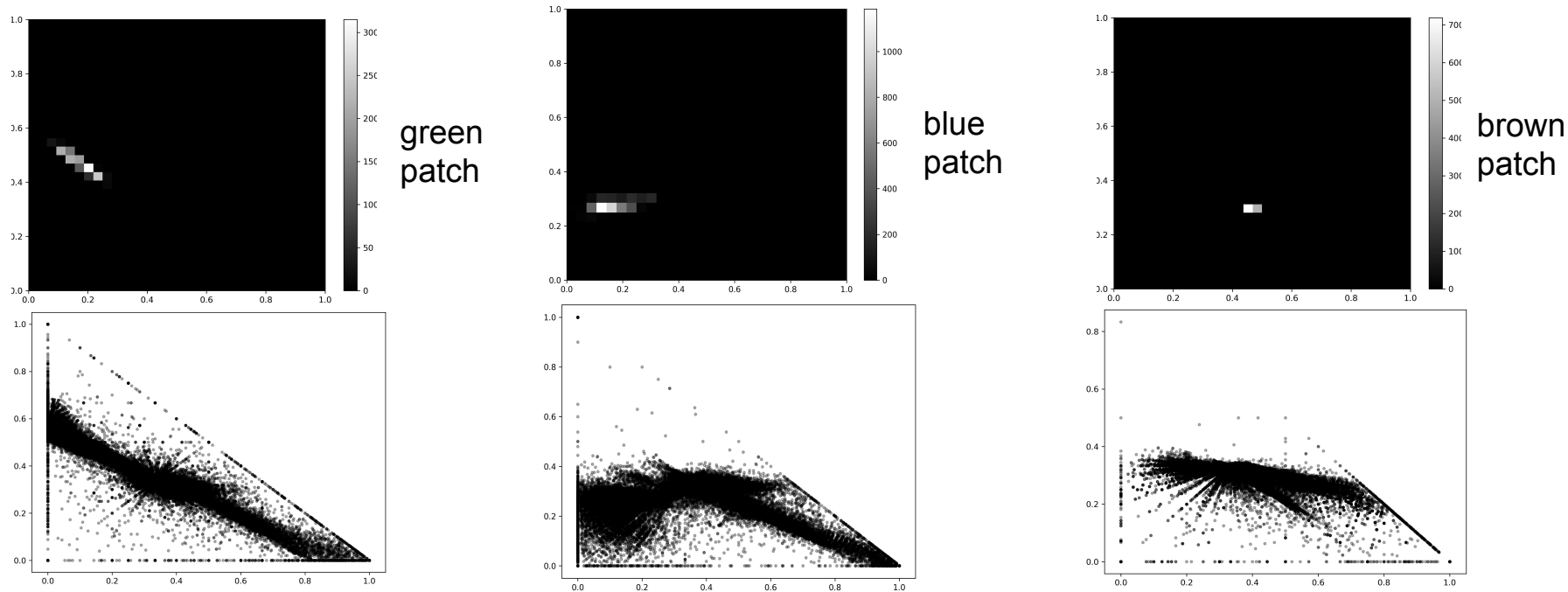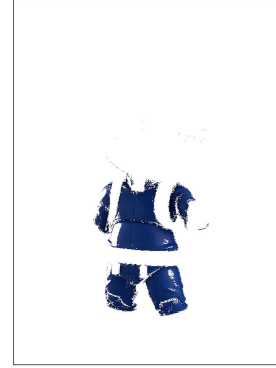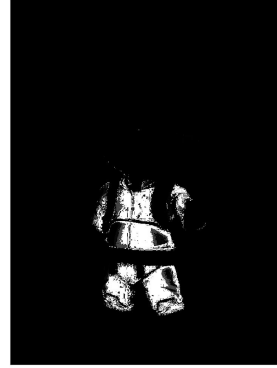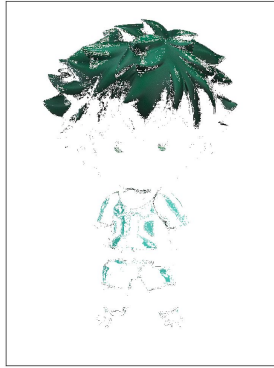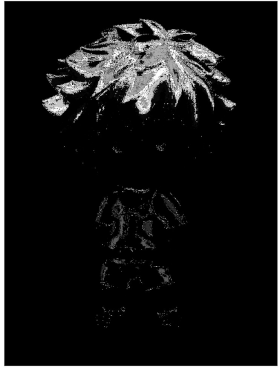The 2D histograms of the patches match with the colors corresponding to the regions of the NCC plot. They match the cluster of points corresponding to the color of the path.

Nonparametric Segmentation

Nonparametric segmentation was able to segment more of the region of interest than parametric segmentation. However, it faces a similar problem with varying intensities in the ROI as parametric segmentation. I tried using a different cropped area, but other parts of the ROI are still sacrificed in the segmentation. I also had to perform trial-and-error on the no. of bins to get the best results. 32 bins is generally a good number.
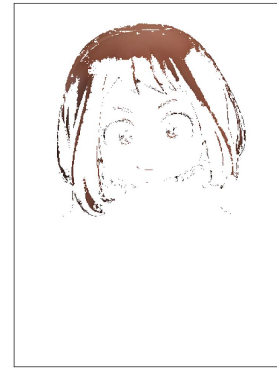
Parametric vs Nonparametric Segmentation

parametric | nonparametric | parametric | nonparametric | parametric | nonparametric
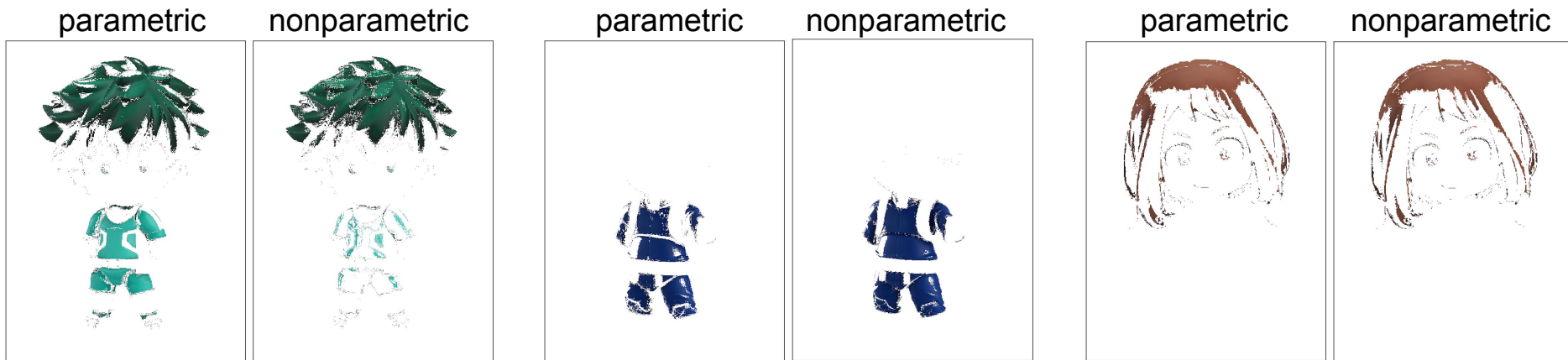
The nonparametric segmentation generally does a better job than the parametric segmentation for these three images. For the first image, the nonparametric segmentation was able to focus on the hair, the actual ROI, instead of the body. For the second image, the nonparametric segmentation got a clearer segmentation of the ROI. There is not much difference in the third image. To get a clearer segmentation, it would be better to include both high and low color intensities in the cropped patch.