CS4650

Assignment 4B: Segmentation of Structures of Interest

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**Image 1**

Original Image Preprocessed Image (Gaussian, sigma=1, gray)

A close-up of a microscope

Description automatically generated A close-up of a microscope

Description automatically generated

K-means Clustering Output Binarized Mask

A black and white background with dots

Description automatically generated A black and white image of dots

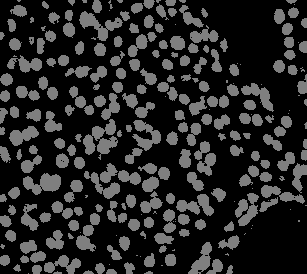
Description automatically generated

Preprocessed Image (Gaussian, sigma=1, RGB)

A close-up of a microscope

Description automatically generated

K-means Clustering Output Binarized Mask

A black and white image of dots

Description automatically generated

Discussion

The results of this application of the k-means clustering method are satisfactory because they achieve nearly a perfect segmentation of cells from the background for this image. The gray feature was slightly better than the RGB channel feature, but both produced usable results. The RGB feature likely had more pixels in the background that resembled a pixel within a cell because the color of the background is similar to that of the cells, but in the gray image the cells are all generally more intense than the background.

**Image 2**

Original Image Preprocessed Image (Median, 5x5 window, gray)

A close-up of a microscope

Description automatically generated A close-up of a microscope

Description automatically generated

K-means Clustering Output Binarized Mask

A black and white speckled background

Description automatically generated A black and white speckled background

Description automatically generated

Preprocessed Image (Median, 5x5 window, RGB)

A close-up of a microscope

Description automatically generated

K-means Clustering Output Binarized Mask

A black and white speckled background

Description automatically generated A black and white speckled background

Description automatically generated

Discussion

In this image, k-means clustering did not achieve a satisfactory result. The gray and RGB images alike had most cells connected with other cells when they were meant to be segmented. This would create a large margin of error in any application on the image from the binarized mask, such as an area of cells calculation. Both the gray and RGB application struggled to separate the darker purple cells from the pink cells, which created many false positives.