

## HW2: Problem 3

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### 1 Read and display the image:

The rose on ice image:



Figure 1: Rose on ice image.

### 2 Part 1

#### 2.1 K-means Clustering: 2 Clusters

Image split into two clusters:

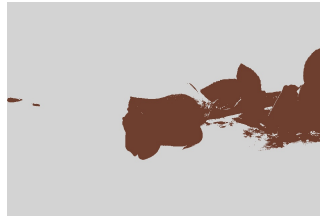


Figure 2: Image with K-means Clustering: 2 Clusters.

#### 2.2 K-means Clustering Histogram: 2 Clusters

Histogram of the image split into two clusters:

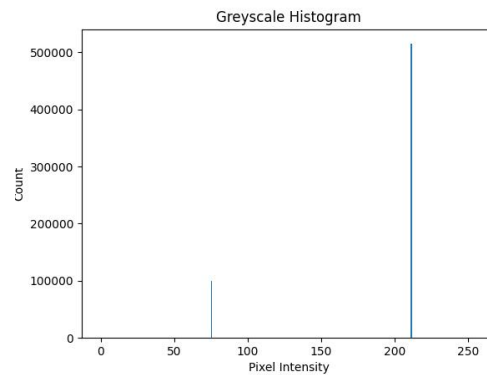


Figure 3: Histogram of image with K-means Clustering: 2 Clusters.

## 2.3 K-means Clustering: 3 Clusters

Image split into three clusters:

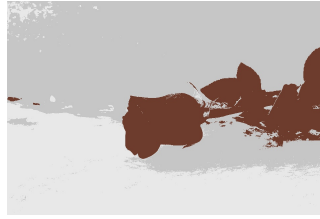


Figure 4: Image with K-means Clustering: 3 Clusters.

## 2.4 K-means Clustering Histogram: 3 Clusters

Histogram of the image split into three clusters:

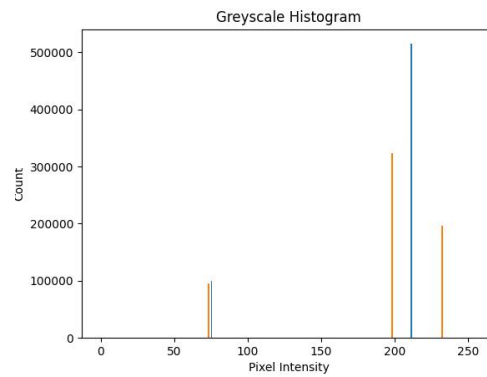


Figure 5: Histogram of image with K-means Clustering: 3 Clusters.

## 2.5 K-means Clustering: 4 Clusters

Image split into four clusters:



Figure 6: Image with K-means Clustering: 4 Clusters.

## 2.6 K-means Clustering Histogram: 4 Clusters

Histogram of the image split into four clusters:

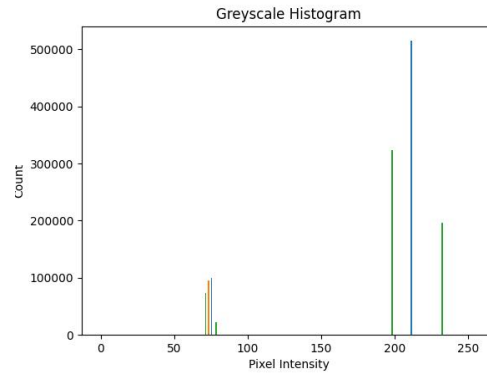


Figure 7: Histogram of image with K-means Clustering: 4 Clusters.

## 2.7 K-means Clustering: 5 Clusters

Image split into five clusters:



Figure 8: Image with K-means Clustering: 5 Clusters.

## 2.8 K-means Clustering Histogram: 5 Clusters

Histogram of the image split into five clusters:

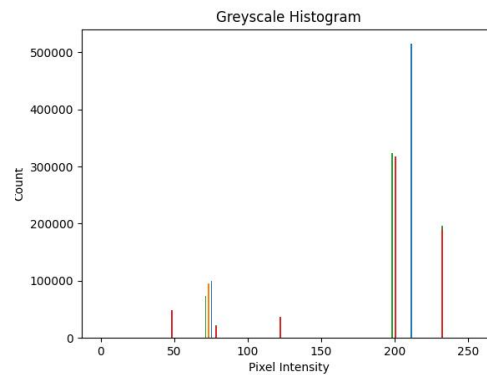


Figure 9: Histogram of image with K-means Clustering: 5 Clusters.

## 3 Part 2

### 3.1 Convert the image into greyscale:



Figure 10: Convert the image into greyscale.

### 3.2 Plot the histogram:

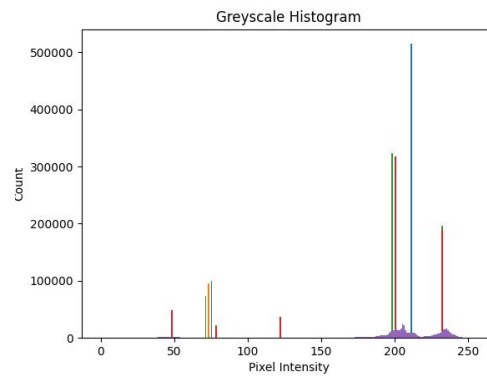


Figure 11: Histogram of greyscale image.

## 4 Part 3

### 4.1 Image thresholded using Otsu's method.

The optimal threshold for the grayscale image determined by Otsu is: 143.



Figure 12: Image thresholded using Otsu's method.

## 4.2 Plot the histogram of the image that underwent Otsu thresholding:

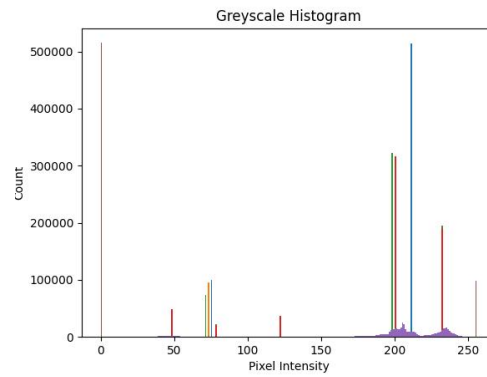


Figure 13: Histogram of greyscale image.

## 5 Part 4

### 5.1 Perform log transformation of the image:

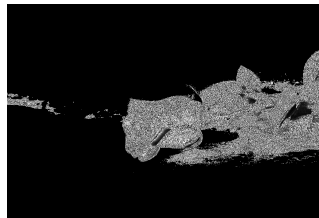


Figure 14: Log transformed image.

### 5.2 Plot the histogram of the image that underwent log transformation:

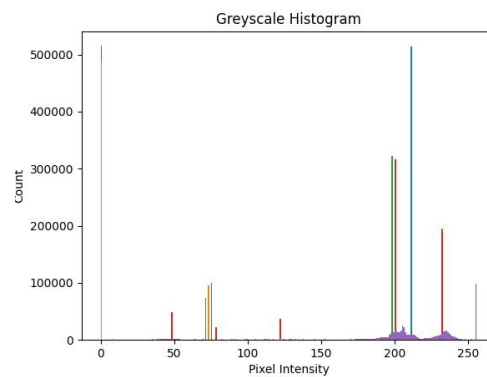


Figure 15: Histogram of log transformed image.



Figure 16: Power law transformed image.

## 6 Part 5

6.1 Perform power law transformation of the image:

6.2 Plot the histogram of the image that underwent power law transformation:

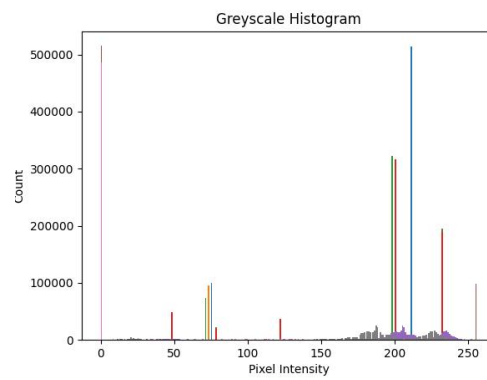


Figure 17: Histogram of power law transformed image.