



**DALHOUSIE
UNIVERSITY**

Inspiring Minds

CSCI 4261 – Intro to Computer Vision

Practicum #2

Topic: K-Means Algorithm from scratch

Instructor: Dr. Carlos Hernandez Castillo

Due date: June 26, 2022

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Segmentation Mosaic



1. **What are the differences between the two types of segmentation (a and b)? Describe how the algorithm is dividing the image.**

One segmentation uses the difference in RGB color space pixels and the other takes into account of the image location as well. The Euclidean distance is found between the centroid and all the input pixels to form clusters. New mean is calculated for the cluster and if the centroid position remains unchanged then k means segmentation is complete.

2. **What was the optimal K for your image and why? Would this number change if you were looking for something different in your image? Think about an example such as if you would try to differentiate shapes, colors, shadows, lines, or texture, what K would you choose then?**

The optimal for my image would be K=5 as this helps to the different structures in the environment, like the sea, sand, trees, and sky. The other K values present more subtle changes in color as segments which would be useful in case specific situations like if we needed to discern the foliage thickness (K=8) or the visibility of sand/shallowest region in seawater (K=9).

3. **Do you think a higher number of clusters will improve your result? Describe in which way.**

A higher number of clusters would provide more segmentation and after a certain point the changes in color would be too small to support a very large K value as the image is segmented based on the K value, this is not viable for my image as it has a limited color space so maybe a more colorful image would find a higher value of K useful. So, I don't think a higher number of clusters is necessary for my image.

4. **If you used for loops to calculate the distances, can you imagine a faster way to run the algorithm? If you, did it differently briefly explain your solution.**

Instead of using for loops we could have a function call itself recursively and have a counter iterate or simply check if the segmented image array is full and then break the recursion sequence to display the image.

Gitlab link: https://git.cs.dal.ca/smahmood/csci_4261_shadman_mahmood.git