

Homework-2 Report

(f)

(i) Briefly describe your implementation, focusing on the interesting aspects. What are some artifacts and/or limitations of this technique, and what are possible reasons for them?

There are two types of implementation is done in the assignment, one is done by texture based and one is done by color based.

In the texture based, first convert the image in the gray scale, apply the given filters, convolve the image, apply k means algorithm on convolved image for image segmentation. Transfer the segmented image to the desire background.

In the color based, there are 3 color based that I used in assignment i.e., LAB, HSV and RGB. First, convert the image to the respective color based and then apply k means algorithm on converted image. Final step is to transfer the color based segmented image to the desired background.

The artifacts/limitations of this technique are following:

- 1) It is hard to find optimal k.
- 2) Based on feature extraction, it is hard to try and error to get the segmented image.
- 3) After deciding k and feature extraction, there might be holes in the segmented image.
- 4) There might be noise from the original background to the new image.

The possible reason for this because there can be part of image in a cluster and removing particular cluster might leave holes in the image. If not removing particular cluster might have some extra feature from the background which is not required.

(ii) Indicate whether or not you implemented your own version of k-means clustering. If your report does not indicate this, we will not specifically check the code and it will be assumed that you did not; no grade will be given here.

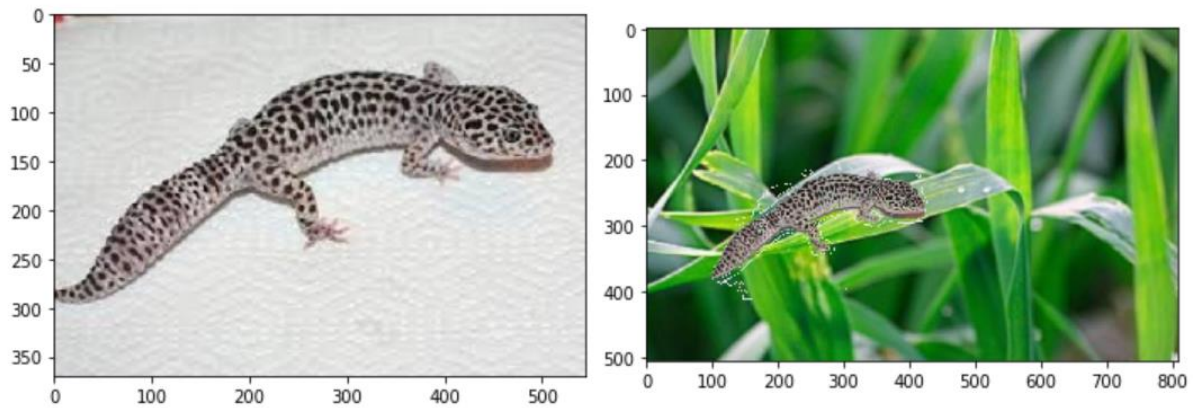
Yes, I have implemented k-means clustering.

Please refer [kmeans_clustering.pdf](#)/[kmeans_clustering.ipynb](#).

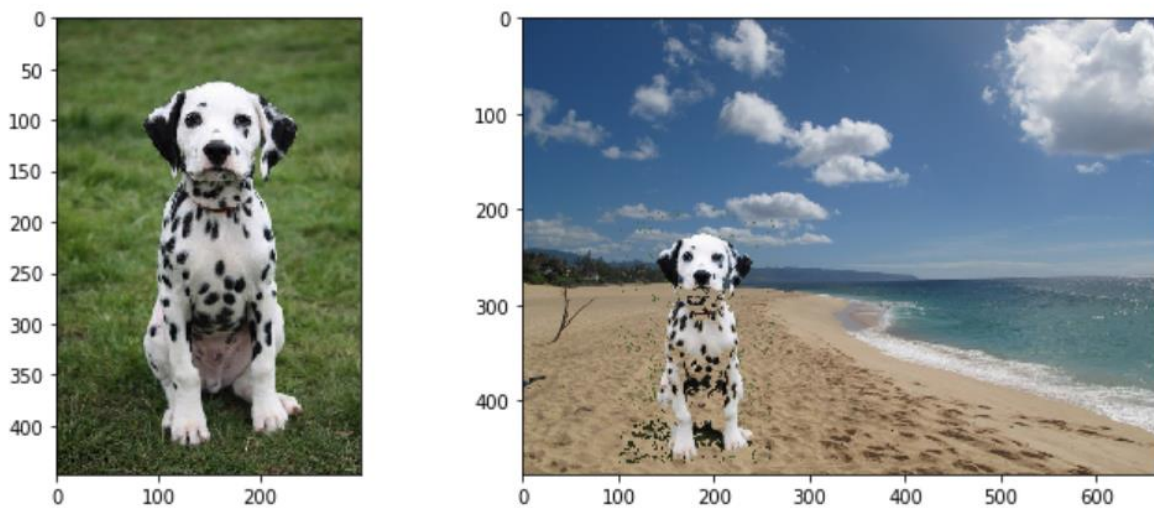
(iii) For the dog image and two other animal images given, display the original source image and the segmented animal transferred to a new background. You can also use a plain white image as the background to showcase your segmentation. Display the texture-based segmentation alongside the color-based ones and discuss the differences.

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Texture based:

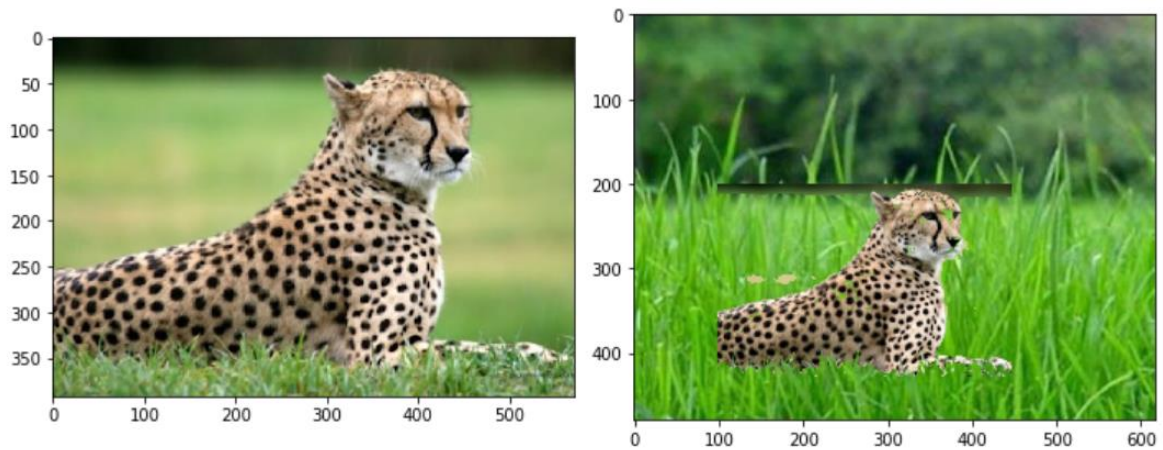


LAB color based:

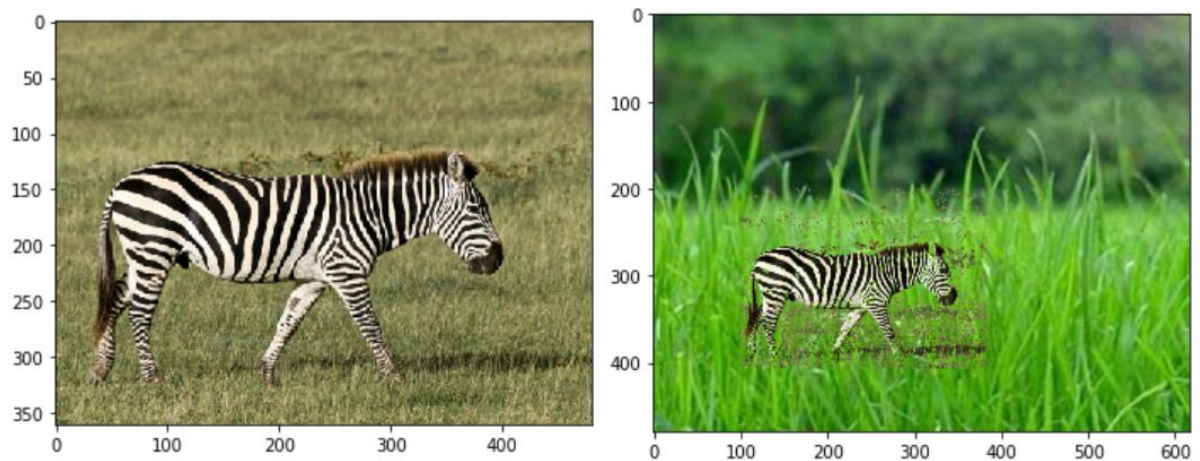


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HSV color based:

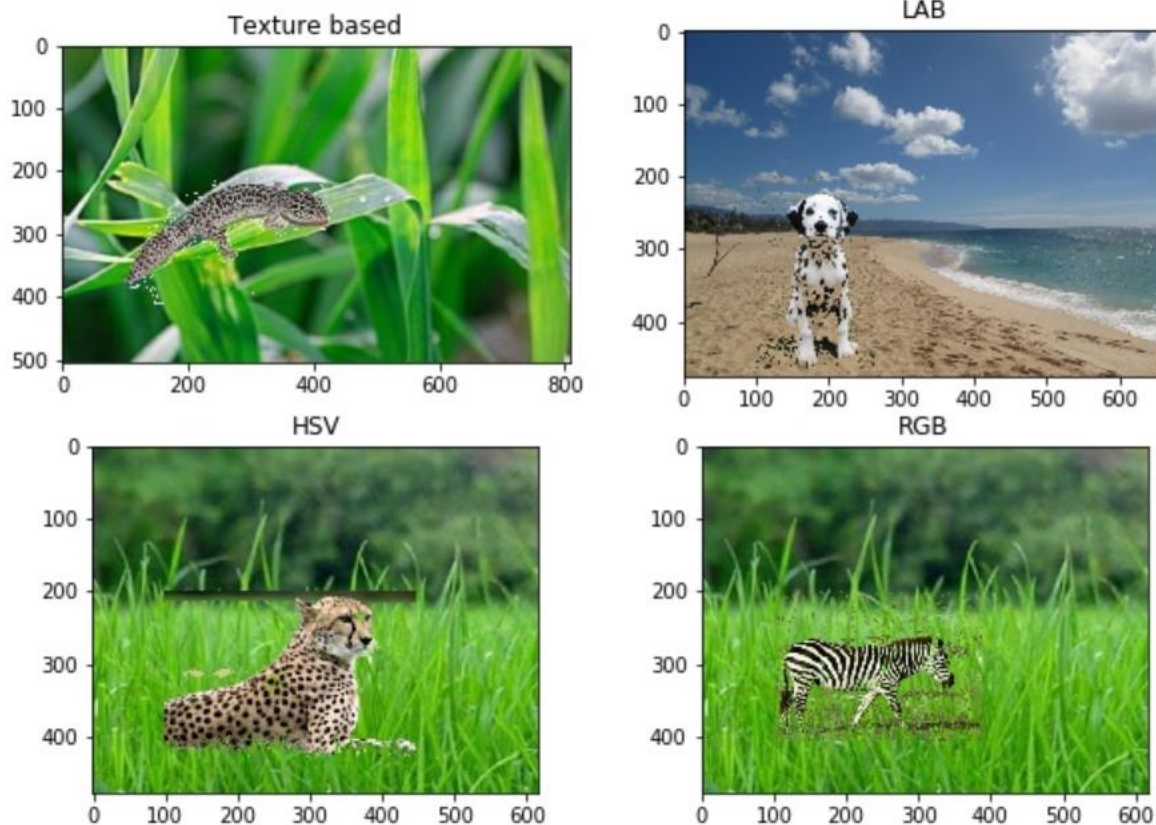


RGB color based:



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Texture based along with color based:



- 1) For texture based, I have used gecko and bg2 as background, $k = 6$ and foregrounds = $[0, 2, 4, 5]$.
- 2) For LAB color based, I have used dog and bg as background, $k = 6$ and foregrounds = $[0, 2]$.
- 3) For HSV color based, I have used cheetah and bg3 as background, $k = 5$ and foregrounds = $[1, 2, 3, 4]$.
- 4) For RGB color based, I have used zebra and bg3 as background, $k = 6$ and foregrounds = $[1, 2]$.

(iv) As you would have noticed, many of the segmentations have holes and artifacts from the background in them. Discuss why this is the case and how different choices in our segmentation strategy could improve the results. Feel free to include additional input images or run additional experiments to illustrate your points.

Many segmentations have holes and artifacts from the background in them because it depends on which part of image comes under which cluster. If some part of image and some part of background

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comes under the same cluster then removing or considering the cluster will cause holes or unwanted part of image in the segmentation respectively.

To improve the result in segmentation, can increase the number of clusters to segment it in better way. Increasing the cluster will segment the image in the more or proper way because it creates more number of clusters which helps to determine the part of image in a better way.