
CS 663 Assignment 3, Question 3

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Code

```
clc; clear all; close all;
warning('off', 'all');

tic;
```

Algorithm for foreground mask

Use K means segmentation with features as RGB and spatial coordinates. I have used it with $K=3$ for both images. Then identify the label given to maximum part of the object in foreground, let's say L . Now, first define a mask = 1 if the pixel belongs to L , or else mask = 0. Currently the mask will have many connected components. So now, use 'bwareafilt' function of matlab to filter out the connected components with lesser pixels. Now, we will have only one connected component in the mask which actually represents the foreground object. But the mask will have some holes in it corresponding to some pixels which got labelled incorrectly by our segmentation algorithm. So now, use matlab function 'imfill' to fill these holes and get the correct mask.

Bird image

We have downsampled the image by a factor of 2 on both axes. Hence, the value of alpha used for this is also halved i.e. $\alpha = 20$.

Code for bird image

```
im = imread('bird.jpg');
im = im(1:2:end, 1:2:end, :);
mask = myForegroundMask(im, 2);
im = double(im);
displayMask(im, mask);
mySpatiallyVaryingKernel(im, mask, 20);

toc;

Elapsed time is 19.978974 seconds.
```

Original Image



Mask



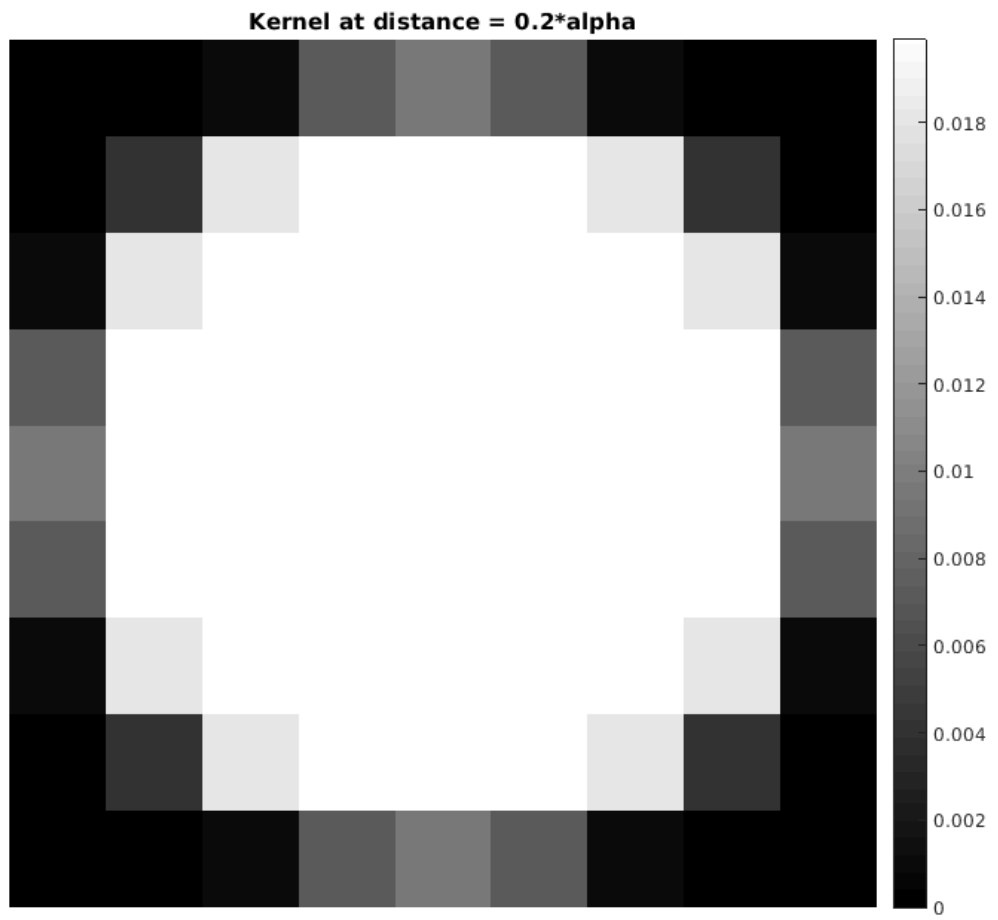
Foreground

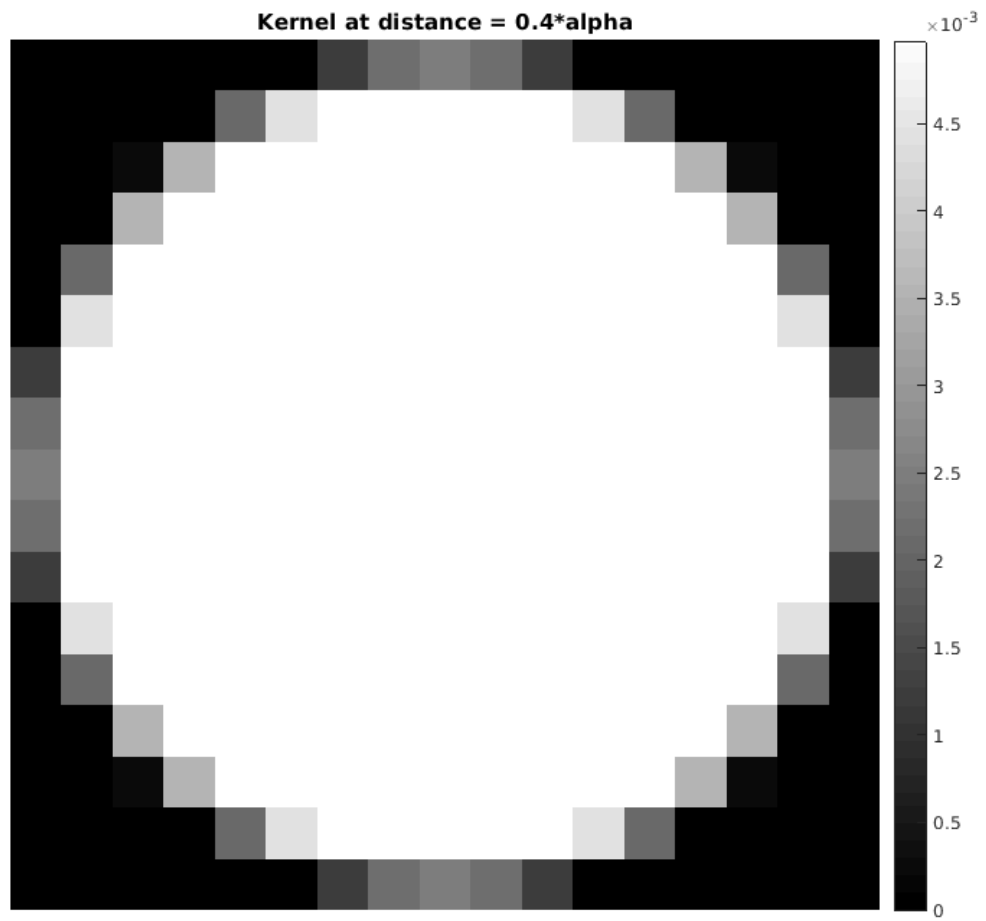


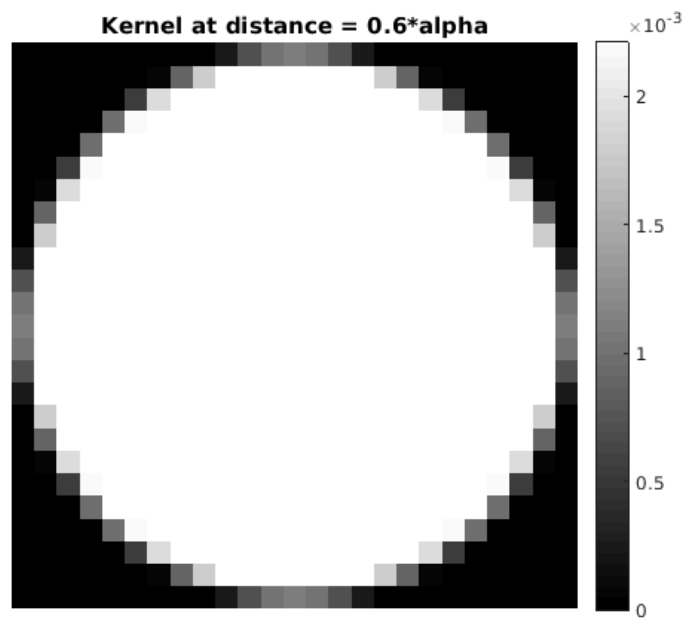
Background

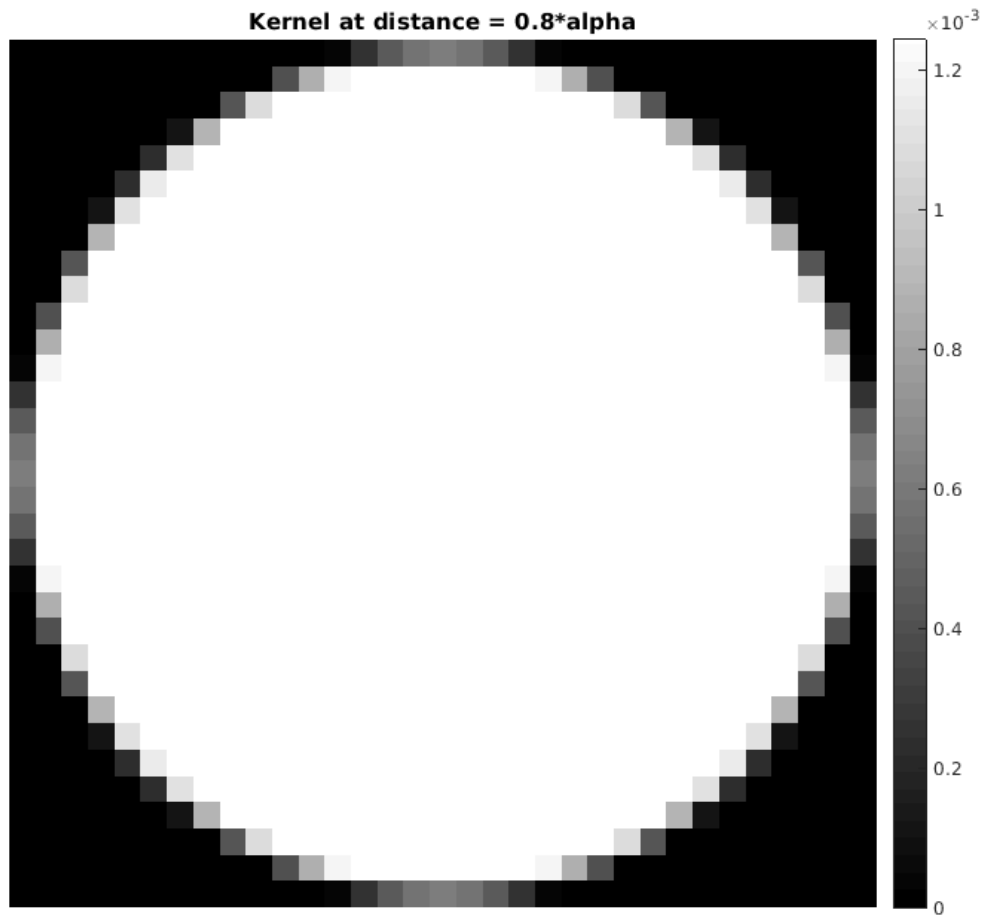


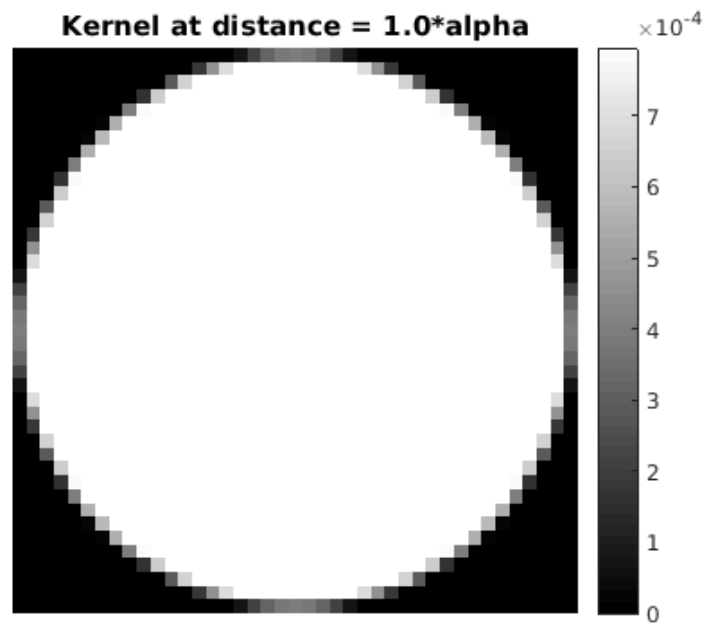












Spatially Varying Blurred Image



Flower image

We have kept the image intact i.e. no downsampling. Hence, $\alpha = 20$.

Code for Flower image

```
im = imread('flower.jpg');  
mask = myForegroundMask(im, 3);  
im = double(im) ;  
displayMask(im, mask);  
mySpatiallyVaryingKernel(im, mask, 20);
```

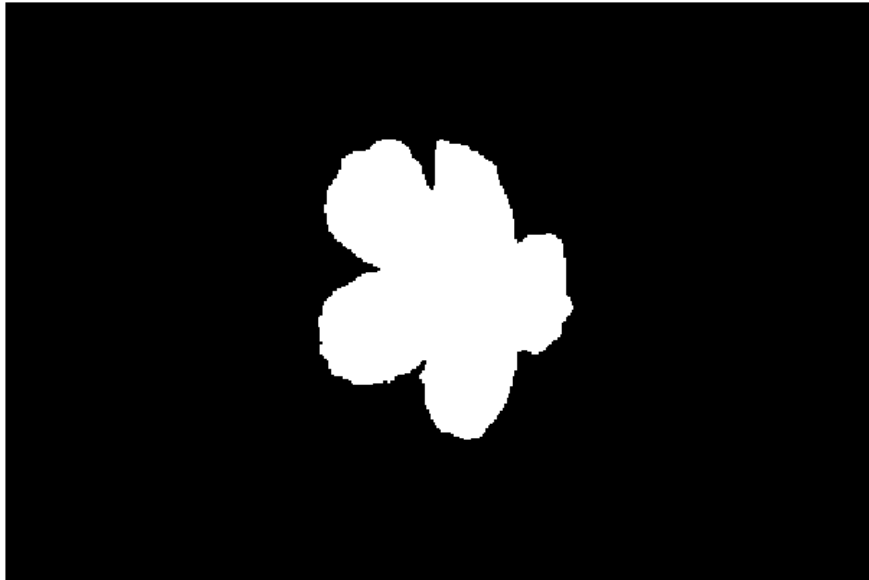
```
toc;
```

Elapsed time is 34.004114 seconds.

Original Image



Mask



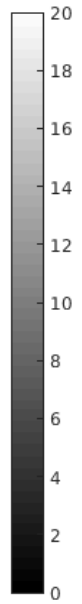
Foreground

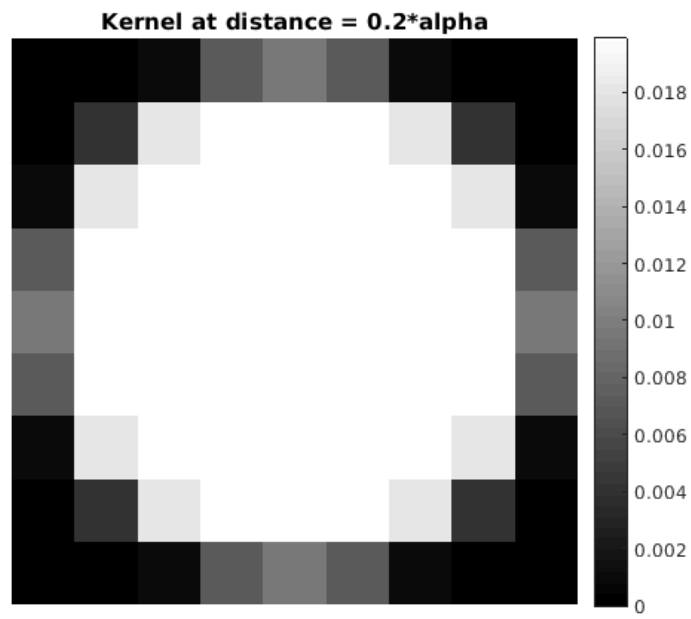


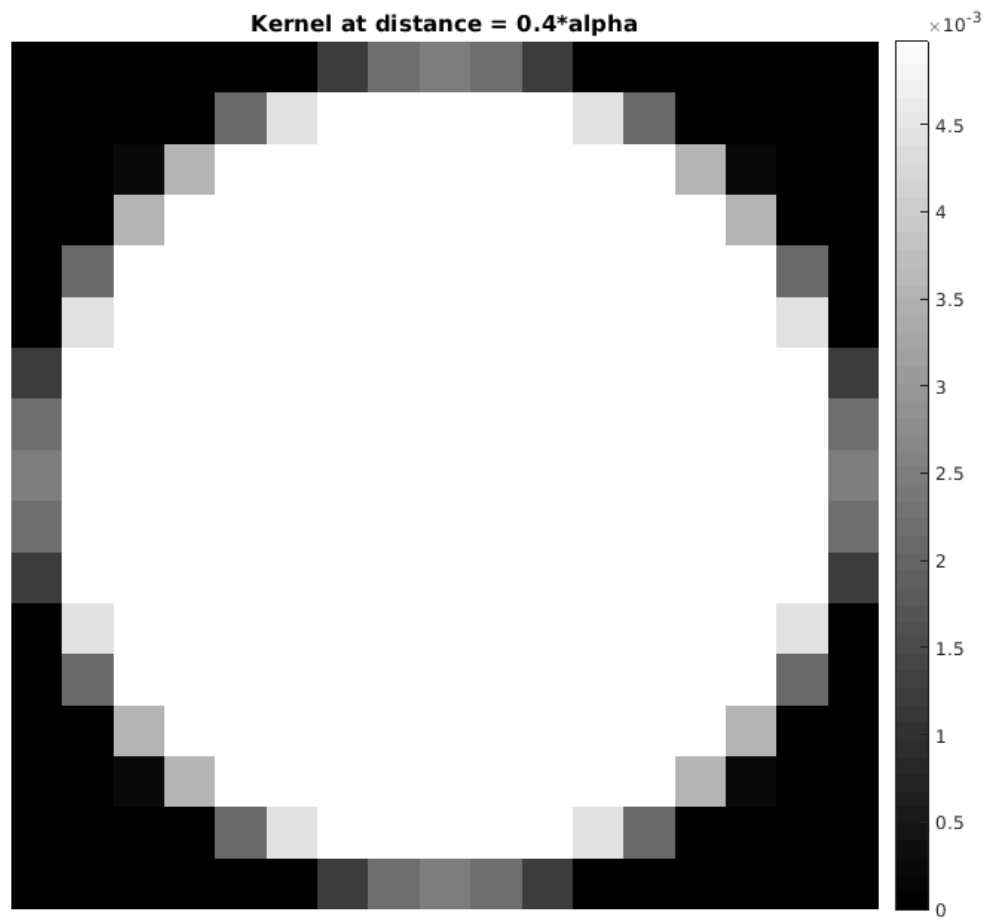
Background

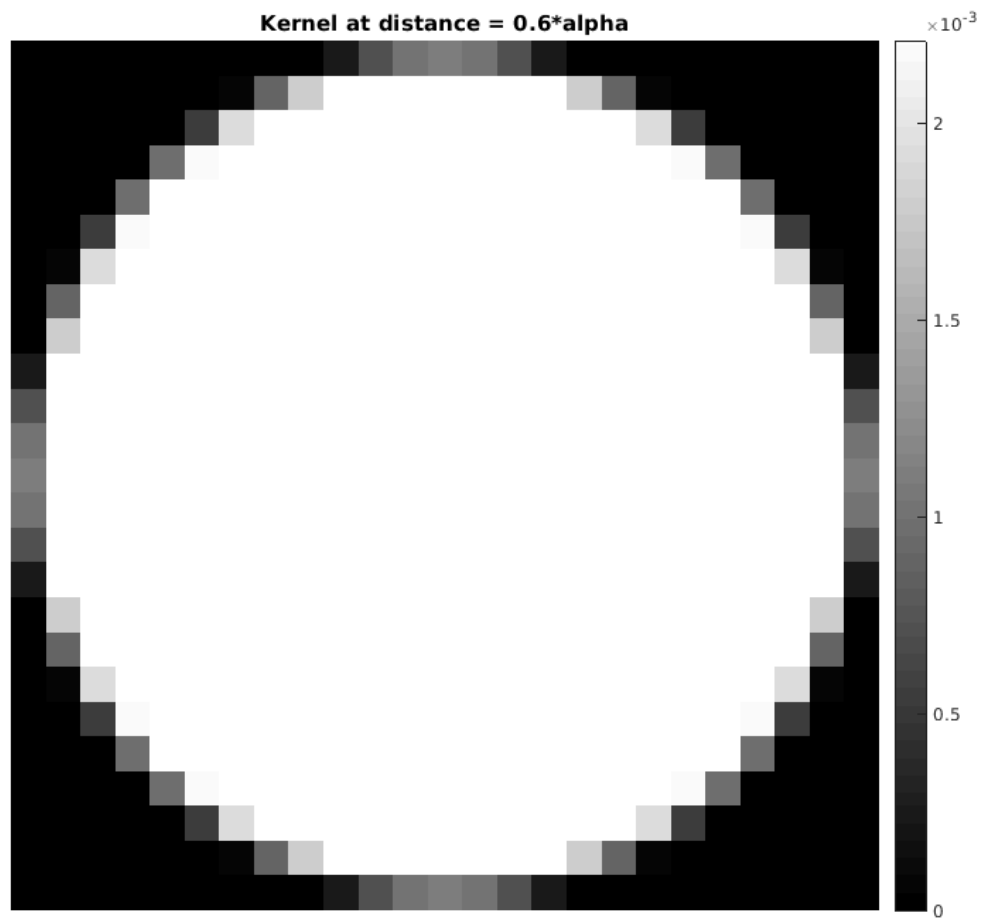


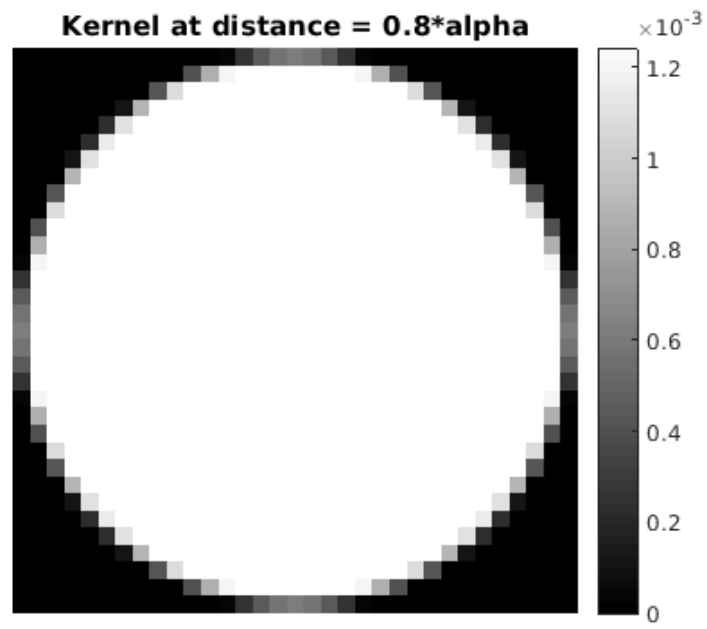
Variation of r

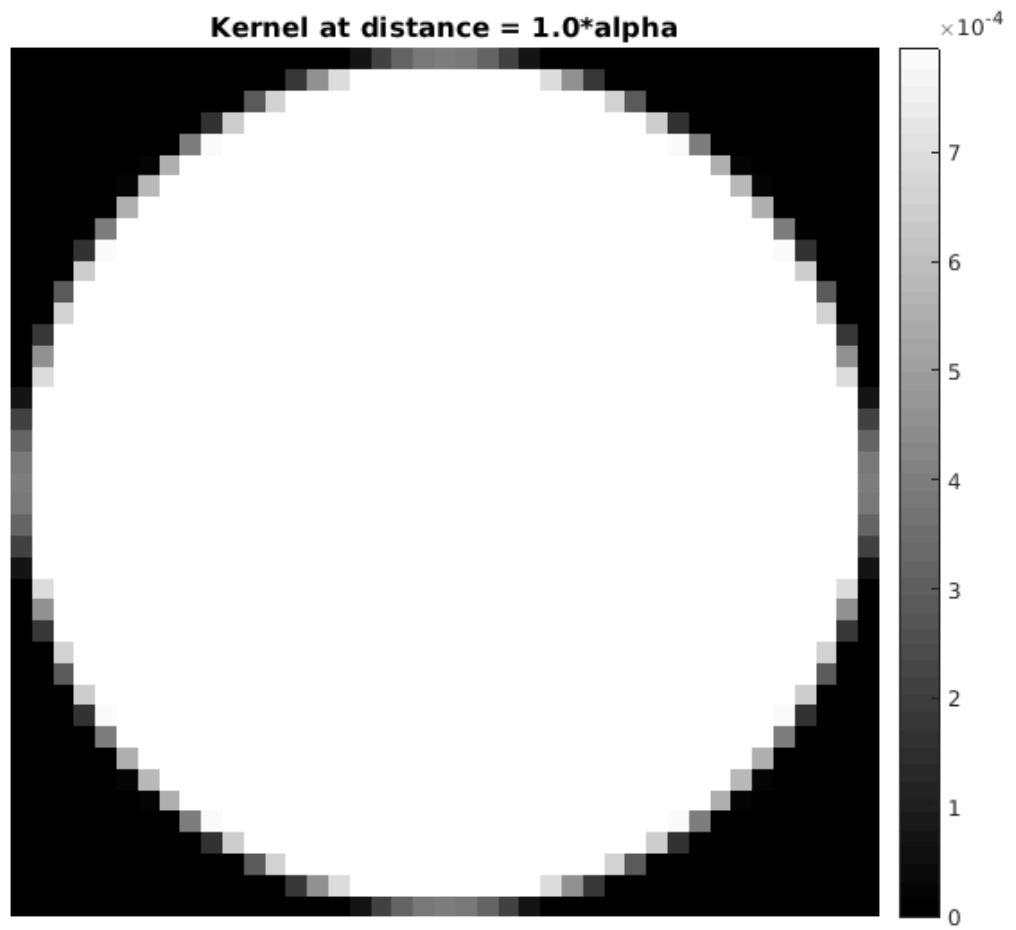












Spatially Varying Blurred Image



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