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MyMainScript

```
tic;
close all;
```

Bird.jpg

For generating the foreground mask for the bird image we detect edges by findinz the zeros of laplacian of gaussain of the image and then using the imfill function to fill the detected boundary. An additional manual mask is used to further restrict the foreground mask. The manual mask is a rough polynomial and the major smoothening is done automatically

```
bird = imread('bird.jpg');
bird = imresize(bird,0.5); %%resizing image by 2 since it takes a lot
 of time
load('binary_bird.mat','binary_bird'); %%loading our manual rough mask
edge_bird = edge(bird(:,:,1),'log');
edge_fill_bird = imfill(edge_bird,'holes');
edge_fill_bird(binary_bird ==0)=0;
bird_fore = bird;
edge_fill_temp(:,:,1)=edge_fill_bird;
edge_fill_temp(:,:,2)=edge_fill_bird;
edge_fill_temp(:,:,3)=edge_fill_bird;
bird_fore(edge_fill_temp==0)=0;
bird_back = bird;
bird_back(edge_fill_temp~=0)=0;
figure;title('Segmentation of Bird');
subplot(1,3,1);imshow(mat2gray(edge_fill_bird));title('Foreground
 Mask');
subplot(1,3,2);imshow(mat2gray(bird_fore));title('Foreground Image');
subplot(1,3,3);imshow(mat2gray(bird_back));title('Background Image');
thresh_bird = 40;
dist_bird = bwdist(edge_fill_bird);
dist_bird(edge_fill_bird~=0) = 0;
dist_bird(dist_bird>thresh_bird) = thresh_bird;
figure;imcontour(dist_bird,100);title('Contour Plot for Bird');
[output_bird] =
 mySpatiallyVaryingKernel(bird,edge_fill_bird,thresh_bird,dist_bird);
k1 = fspecial('disk',0.2*thresh_bird);
k2 = fspecial('disk',0.4*thresh_bird);
k3 = fspecial('disk',0.6*thresh_bird);
k4 = fspecial('disk',0.8*thresh_bird);
k5 = fspecial('disk',thresh_bird);
```

```matlab
figure;title('Kernels Used for Filtering')
subplot(3,2,1);imshow(mat2gray(k1));title('0.2*thresh');
subplot(3,2,2);imshow(mat2gray(k2));title('0.4*thresh');
subplot(3,2,3);imshow(mat2gray(k3));title('0.6*thresh');
subplot(3,2,4);imshow(mat2gray(k4));title('0.8*thresh');
positionVector = [0.35, 0.1, 0.35, 0.2];
subplot('Position',positionVector);imshow(mat2gray(k5));title('thresh');
figure;imshow(mat2gray(output_bird));title('Output Image for Bird');
```
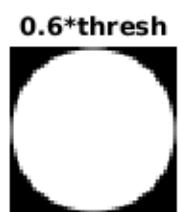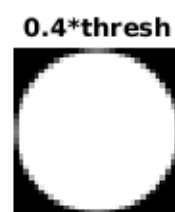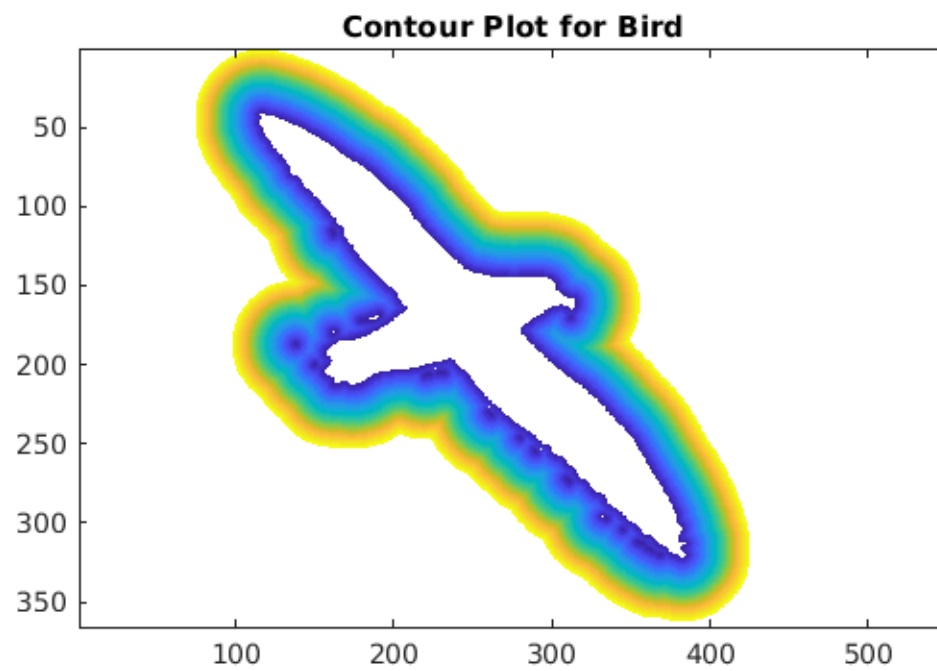

Foreground Mask   **Foreground Image**   **Background Image**

Contour Plot for Bird

0.2*thresh

0.4*thresh

0.6*thresh

0.8*thresh

thresh

Output Image for Bird

Flower.jpg

In case of flower image, we detect the foreground by first detecting the edges using the canny edge detection method. After that we manually join some points in the binary image in order to make use of the imfill function in Matlab

```matlab
flower = imread('flower.jpg');
edge_flower= edge(flower(:,:,3),'Canny',[0.25,0.7],2); %threshold low
 is 0.25, threshold high is 0.7 and variance of gaussian is 2
edge_flower([133;133;133;132;91;117],[183;184;185;185;209;249])=1; %
%manually joining a few points
edge_fill_flower = imfill(edge_flower,'holes');
flower_fore = flower;
flower_back = flower;
edge_fill_temp_flower(:,:,1)=edge_fill_flower;
edge_fill_temp_flower(:,:,2)=edge_fill_flower;
edge_fill_temp_flower(:,:,3)=edge_fill_flower;
flower_fore(edge_fill_temp_flower==0)=0;
flower_back(edge_fill_temp_flower~=0)=0;
figure;title('Segmentation of Flower');
subplot(1,3,1);imshow(mat2gray(edge_fill_flower));title('Foreground
 Mask');
subplot(1,3,2);imshow(mat2gray(flower_fore));title('Foreground
 Image');
subplot(1,3,3);imshow(mat2gray(flower_back));title('Background
 Image');
```

```
thresh_flower = 20;
dist_flower = bwdist(edge_fill_flower);
dist_flower(edge_fill_flower~=0) = 0;
dist_flower(dist_flower>thresh_flower) = thresh_flower;
figure;imcontour(dist_flower,100);title('Contour Plot for Flower');
[output_flower] =
 mySpatiallyVaryingKernel(flower,edge_fill_flower,thresh_flower,dist_flower);
k1 = fspecial('disk',0.2*thresh_flower);
k2 = fspecial('disk',0.4*thresh_flower);
k3 = fspecial('disk',0.6*thresh_flower);
k4 = fspecial('disk',0.8*thresh_flower);
k5 = fspecial('disk',thresh_flower);
figure;title('Kernels Used for Filtering')
subplot(3,2,1);imshow(mat2gray(k1));title('0.2*thresh');
subplot(3,2,2);imshow(mat2gray(k2));title('0.4*thresh');
subplot(3,2,3);imshow(mat2gray(k3));title('0.6*thresh');
subplot(3,2,4);imshow(mat2gray(k4));title('0.8*thresh');
positionVector = [0.35, 0.1, 0.35, 0.2];
subplot('Position',positionVector);imshow(mat2gray(k5));title('thresh');
figure;imshow(mat2gray(output_flower));title('Output Image for
 Flower');

toc;

Elapsed time is 206.545298 seconds.
```
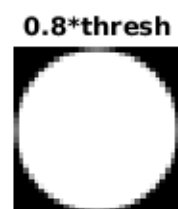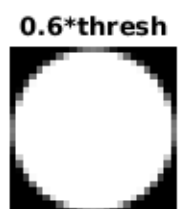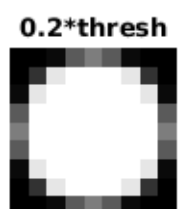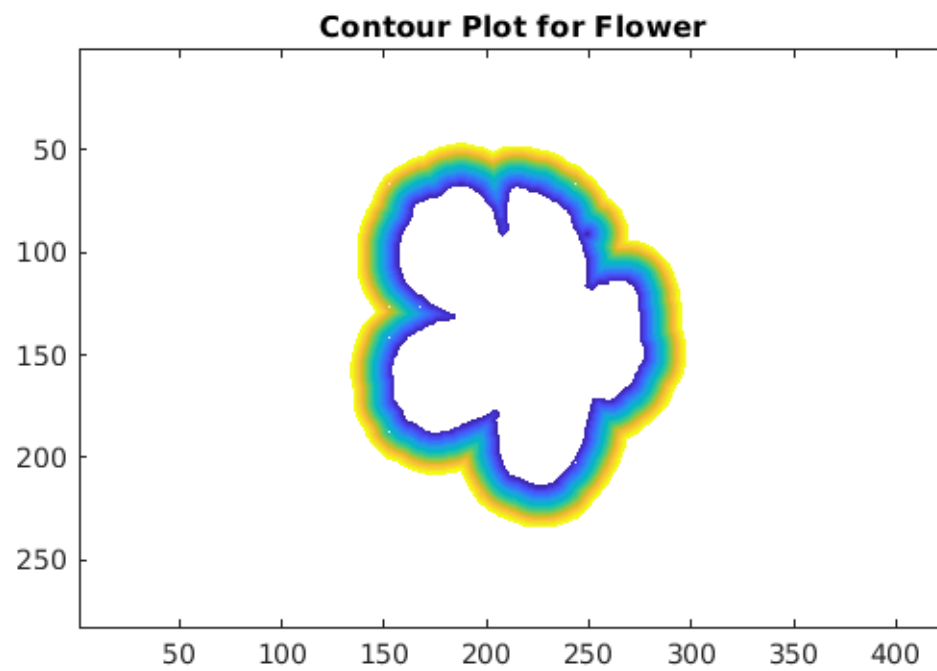
Foreground Mask   **Foreground Image**   **Background Image**

Contour Plot for Flower

0.2*thresh

0.4*thresh

0.6*thresh

0.8*thresh

thresh

Output Image for Flower

Published with MATLAB® R2019a