CSCE-689 Computational Photography

Programming Assignment 3

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Poisson Blending

This task involves combining two images using gradients. The result creates a seamless blend of the mased regions of the source image into a target image.

Main steps in the implementation:

1. Form the sparse matrix A with 1s in diagonal of the rows corresponding to the 0s in the mask and Laplacian filter values corresponding to the 1s in the mask.
2. Similarly, form the vector b with target pixel values corresponding to the 0s in the mask and Laplacian of the source corresponding to the 1s in the mask.
3. If there are any neighboring pixels out of range, those are ignored while computing Laplacian in the vector b and also corresponding values in matrix A are set to 0.
4. Solve the equation Ax = b to find x and reshape it to give the blended result.

Following are the results:

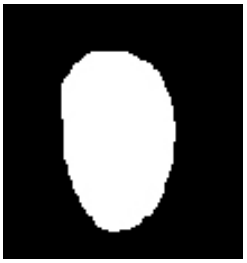
Source_01

mask_01

target_01

Blended image

Source_02



mask_02

target_02

Blended image

Source_03

mask_03

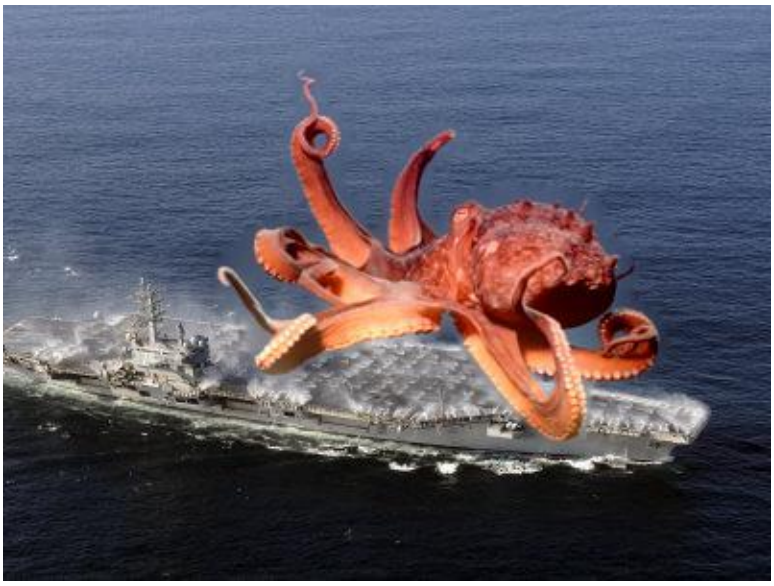
Target_03

Blended image

Source_04

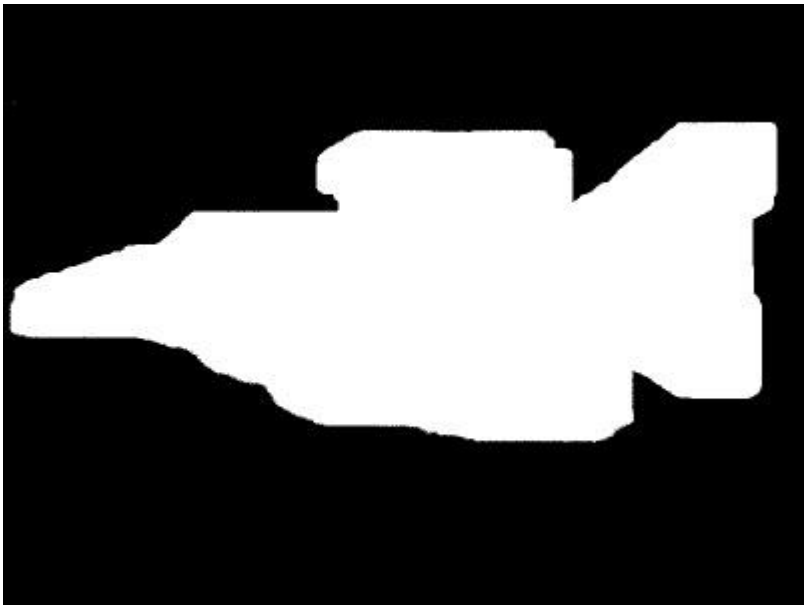
mask_04

Target_04



Blended image

source_05

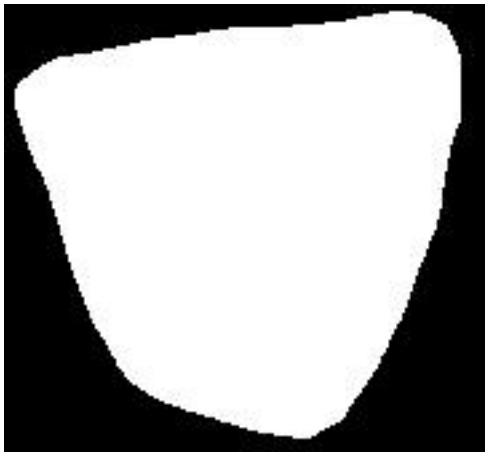


Mask_05

Target_05

Blended image

Source_06

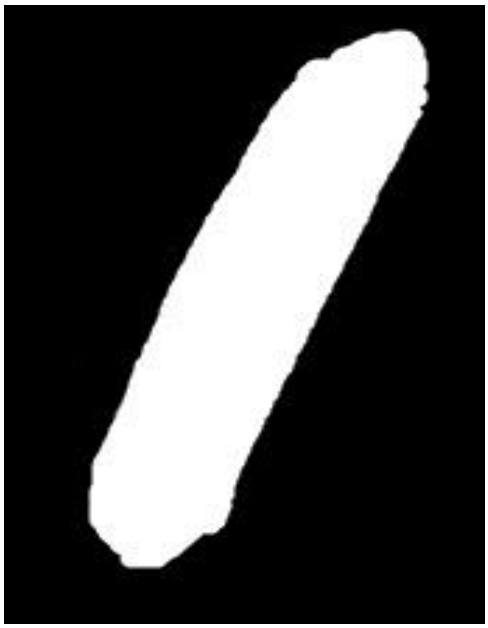


mask_06

target_06

blended image

Source_07



mask_07

Target_07

blended image

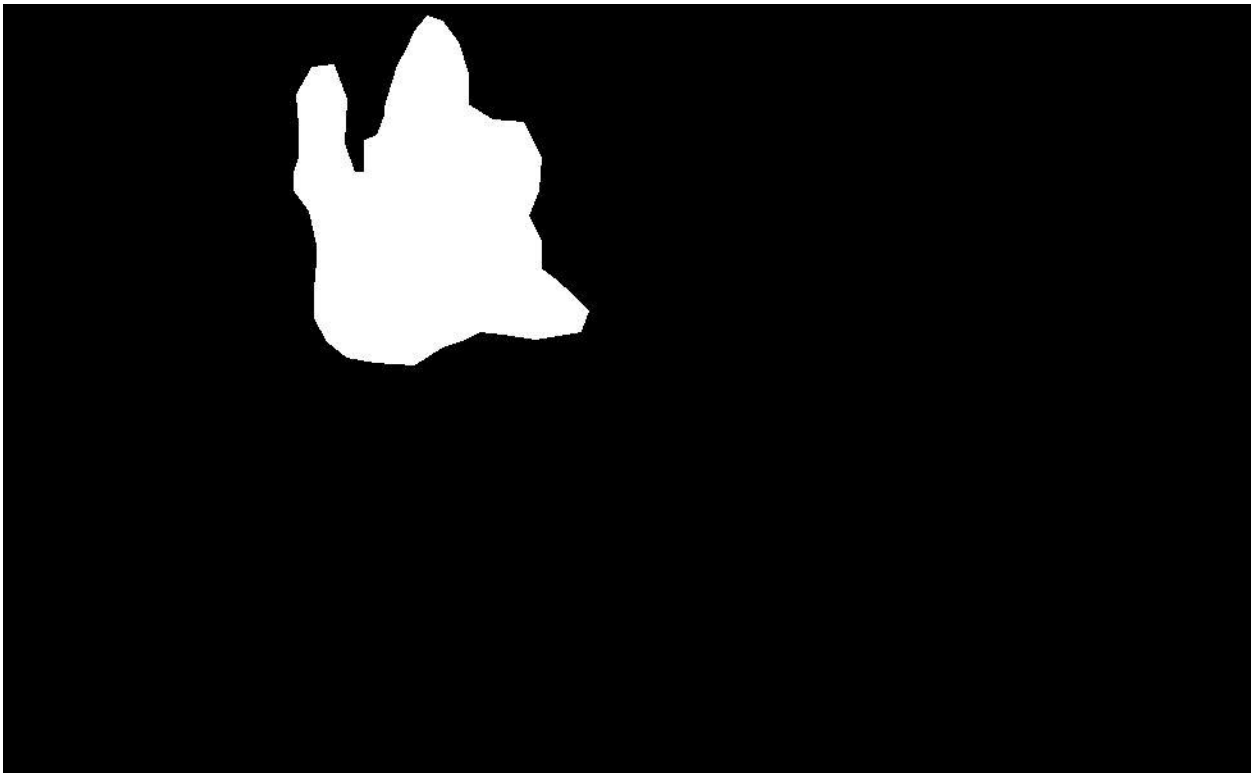
In the last two results, there is a need for **gradient mixing** ie, at each pixel location corresponding to the the 1s in the masked region, the resulting image laplacian is expected to match that of the maximum of source and target laplacian values for each neighbour. The vector b in Ax=b is modified accordingly. Below are the results.

Result of blending source_06 and target_06 with gradient mixing

Result of blending source_07 and target_07 with gradient mixing

My images:

Source_08



Mask_08

Target_08

Blended image