

Project 1: Image Editing

1 Background

Image editing is the process of altering or enhancing digital images using various techniques, which has a wide range of application scenarios in real life. Relevant techniques includes image resizing, image cropping, image matting, image synthesis and so on.

Seam carving is an algorithm for content-aware image resizing. It functions by establishing a number of seams (paths of least importance) in an image and automatically removes seams to reduce image size or inserts seams to extend it, see Fig. 1. Seam carving also allows manually defining areas in which pixels may not be modified, and features the ability to remove whole objects from photographs.



Figure 1: Seam Carving

2 Goal

In this project, you are asked to implement image editing follow these steps:

- There are two given pictures `imges/background.png` and `imges/object.png`, see Fig 2 and Fig 3. Expand `background.png` using Seam Carving to ensure enough space between characters, see Fig 4. For appropriately resizing the image without distorting

the cartoon characters, you may need to get the mask of the characters using image matting skills and use the mask in Seam Carving.

- Using conventional image matting algorithm you like to get the foreground from `object.png`, see Fig 5, for evaluation, you can use `GT/mask.png`. The foreground image you get need to be cropped for further operation.
- Using conventional image synthesis algorithm you like to integrate the foreground into the expanded background image you got previously, see Fig 6.



Figure 2: background.png



Figure 3: object.png



Figure 4: expanded image using seam carving

3 Notes

Attention: Algorithms used for image resizing and matting should be implemented by yourself, otherwise your rating will be negatively affected



Figure 5: foreground



Figure 6: foreground

For implementation details of Seam Carving, you can refer to [Seam carving for content-aware image resizing](#).