CENG 391 Introduction to Image Understanding

November 10, 2016

Image Stitching

Image stitching is the process of combining two images which have common part to obtain panorama.

1. Execute the "Matching Marking & Editing Tool"(can be reached from CMS as a solution of Homework 1) with two given images.

2. Select **at least 4** correspondences from the tool so that their locations are written to the file by the application.

3. Compute homography between two given images by giving selected points to the **findHomography()** method of OpenCV.

4. Compute the inverse of the homography that is computed in the previous step. Warp the **second image** by calling the **warpPerspective()** method of OpenCV.

   This method takes the size of the output image that will generated after warping as a parameter so you need to compute the size of the warped image before calling the method. To compute it, multiply corners of the second image with the homography which is given to the method and find their locations as it is shown in Figure 1. **The size of the output image should be sufficient for combination of input images. So, you should take into account the corners of the first image as well and determine the maximum and minimum (x,y) locations to compute the size of the output image.**

5. Warp the first image with an **Identity matrix** as a homography and give size of the output image which you found in the previous step as a parameter to the OpenCV method. This combined process is shown in Figure 2.

6. Combine these two warped images by applying **interpolation** and save the output image as "panorama.png"

   To combine them, first produce a mask M, then calculate the output image by using the Equation 1:

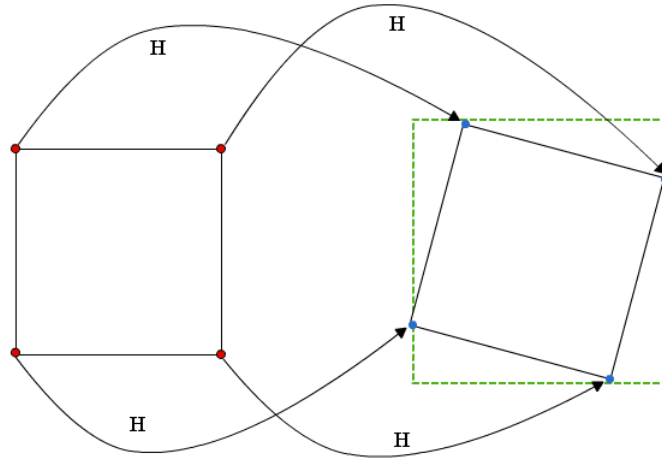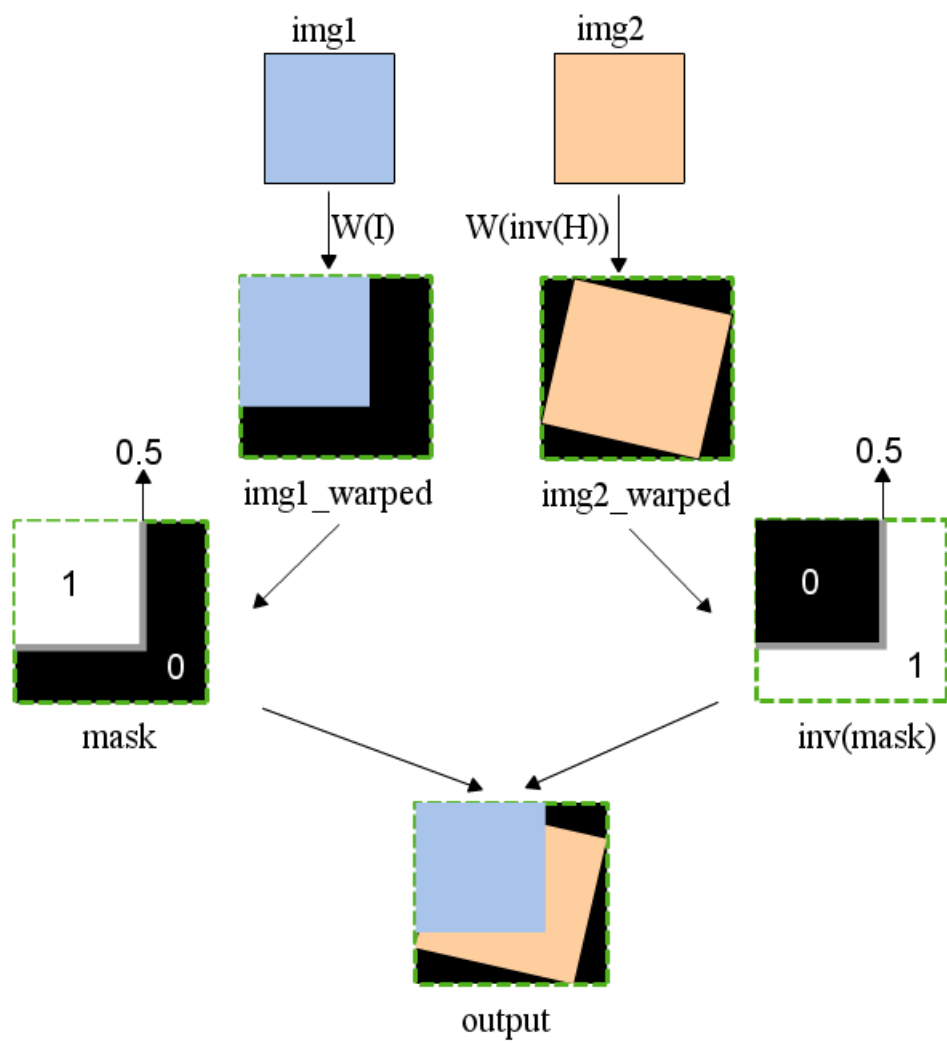$$Output = (I_1 * M) + I_2 * (1 - M) \tag{1}$$

Figure 1: Computing the size of the warped image.

Figure 2: The panorama generation.