# Assignment 4 Image Alignment and Stitching

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## Introduction

This report will look at image alignment and image stitching. In image alignment, the affine transformation between two images will be computed. To get to this point we will first detect the interest points in each image. Then we will characterize the local appearance of the regions around the interest points. After this we will get the set of supposed matches between region descriptors in each image. In the end we will perform RANSAC to discover the best transformation between images. In the image stitching part, we will stitch two images together, by using the method in the previous section.

## 1 Image Alignment

### Question 1

After executing RANSAC on the keypoints found in the two boat images, we obtain the following visualizations of the transformation:

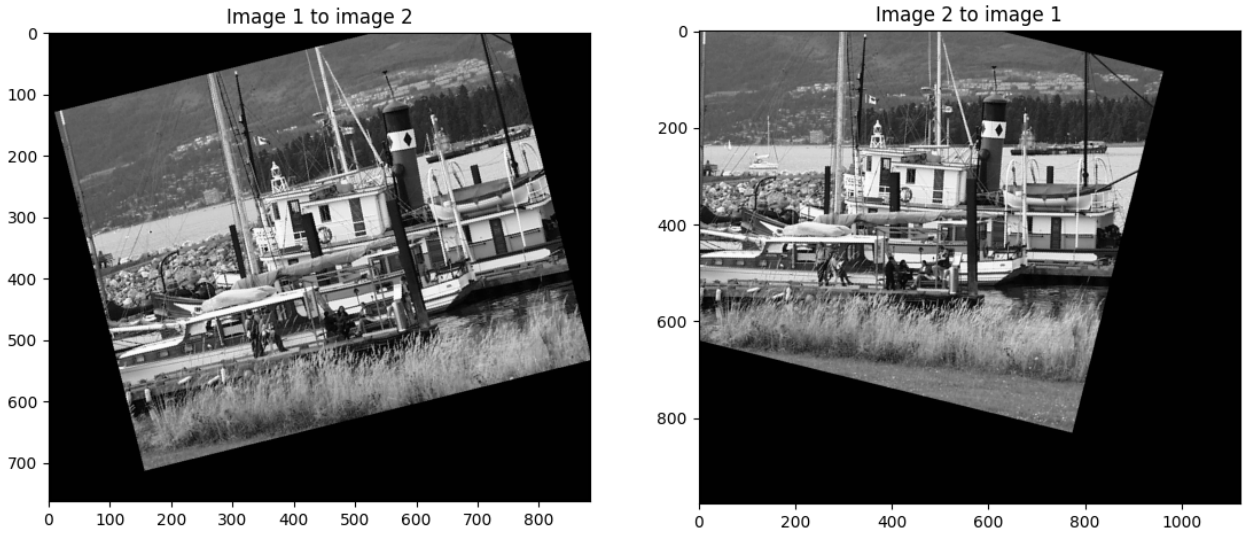



Figure 1: Approximated transform with keypoints found in the boat images.

### Question 2

1. We will need a minimum of 6 points to solve an affine transformation in 2 dimensional space. We need 3 points from image 1 and 3 points from image 2, meaning we need at least 3 matches. This gives us $2 * 3 = 6$ points that we need as a minimum.
2. The RANSAC algorithm gives a stable solution with 100 iterations with 4 samples on average for the boat. The tram only sometimes works, therefore we do not have a good amount of iterations for the tram.

# 2 Image Stitching

## Question 1

After stitching the pictures we get the following images.

(a)

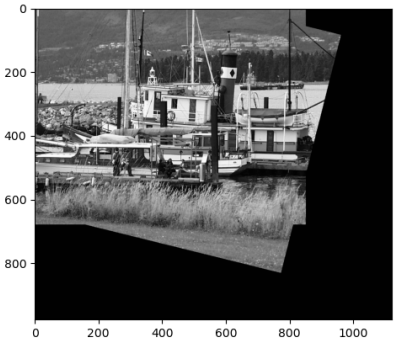
(b)


(c)

Figure 2: Stiching of left.jpg and right.jpg

(a)

(b)




(c)

Figure 3: Stiching of boat1.pgm and boat2.pgm

# Conclusion

In the end we learned how image alignment and image stitching works. We created an algorithm to compute the affine transformation between two images and used this to stitch the images together by transforming the coordinate space of one of them to the other.