

# CENG 391 Introduction to Image Understanding

December 8, 2016

## Homography Estimation with RANSAC

Write a C++/Python program that operates the following tasks.

1. Read the images("img1.jpg", "img2.jpg")
2. Read the correspondences from the file "corrs.txt"
3. Choose the number of iterations  $N$  as 10000 initially.
4. Select 4 random correspondences.
5. Compute homography( $H$ ) with these correspondences by applying DLT algorithm that we have seen in the last week.
6. Transform points from reference image to query image for each potential correspondence between the images:  $x' = H * x$
7. Count number of inliers as follows:
  - Check whether there exists any point close to transformed points with the Euclidean distance at most **3 pixels**.
8. Compute the inlier ratio as follows:

$$\text{inlierRatio} = \% \frac{\text{numberOfInliers}}{\text{numberOfCorrespondences}} \quad (1)$$

9. Update  $N$  as follows:

- (a) Calculate the probability( $w$ ) of each of the randomly selected correspondence is inlier.
  - (b)  $1 - (1 - w^s)^N \geq 0.99$ . From there, calculate  $N$ .
- 10. Repeat step[4-9]  $N$  times and save the homography that gives the maximum inlier ratio.
- 11. Warp the second image with the inverse of the final computed homography.