

CSE327 Fall 2023 Homework 7 (10pts)

Due Nov 8 2023, 11:59PM, submitted via Brightspace

Use the two given images (or take some pictures by yourself) for this assignment.

1. Homography matrix estimation (4 points)

Mouse-click N points in the image 1 (e.g., use `ginput()` function in Matlab). Mouse click the N corresponding points in the image 2.

- (1). Use the eigen decomposition to solve the Homograph transformation matrix from image 1 to image 2.
2. E.g., (x_1, y_1) is one point in image 1 and (x_2, y_2) is one point in image 2, the two points are related by

$$\begin{bmatrix} x_2 \\ y_2 \\ 1 \end{bmatrix} \sim \begin{bmatrix} h_{11} & h_{12} & h_{13} \\ h_{21} & h_{22} & h_{23} \\ h_{31} & h_{32} & h_{33} \end{bmatrix} \begin{bmatrix} x_1 \\ y_1 \\ 1 \end{bmatrix}$$

- (2). Use the singular value decomposition to solve the Homograph transformation matrix from image 1 to image 2;

2. Based on the computed Homography matrix, implement the forward and backward warping to warp image 1 to the coordinate of image 2. (6 points)

- (1) In the forward warping, use the nearest neighbor for interpolation;
- (2) In the backward warping, try different interpolation methods (nearest and bilinear);
- (3) Use `interp2()` function for the backward warping.

Zip and upload your folder with codes and a briefly written report to Brightspace by the due date/time.