

Homework 2

Problem 1: Preprocessing

The preprocessing step involved obtaining the keypoints in the image. We do this by first obtaining the gradients in different directions followed by calculating the Hessian matrix. Once we get the Hessian matrix, we threshold the image to get distinct keypoints and finally we perform non-maximum suppression on the image.

These keypoints will be used in the RANSAC algorithm.

Problem 2: RANSAC

The RANSAC algorithm involves finding lines in the input image. We begin by taking random keypoints in the image and find inliers. Once we get the points with maximum inliers, we plot these points on the image to get the final RANSAC output. The parameters used to execute this algorithm are listed below:

$$t = 1.95$$

$$d = 10$$

Problem 3: Hough Transform

For the Hough transform, we first perform edge detection on the image using the `Filter()` function already defined in the code followed by non-maximum suppression. Once we get the edge detected image, we build the accumulator matrix based on the bin dimension (i.e. angles per bin). Using this accumulator matrix, we find edges in the image.

The detected lines are somewhat deflected from the real edges due to noise in the image.