Computer Vision I

Project 3
Stereo

Given March 24, 2023, Due: April 14, 2023

The goal of this exercise is to explore stereo vision. Consider the following stereo pairs:

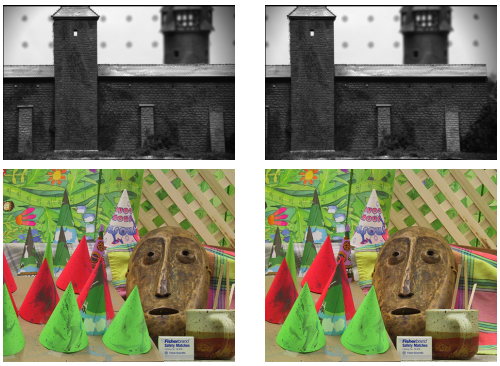

Figure 1: Stereo Pairs

1. Find interesting features and correspondences between the left and right images. You can use the CORNERS and NCC algorithms that you wrote/used for the second project or SIFT features and descriptors. Display your results in the same way you did for project 2 i.e. by connecting corresponding features with a line. Using lines of different colors for different points makes it easier to visualize the results.

2. Write a program to estimate the *Fundamental Matrix* for each pair using the correspondences above and RANSAC to eliminate outliers. Display the inlier correspondences in the same way as above.

3. Compute a **dense disparity map** using the Fundamental matrix to help reduce the search space. The output should be three images, one image with the vertical disparity component, and another image with the horizontal disparity component, and a third image representing the disparity vector using color, where the direction of the vector is coded by hue, and the length of the vector is coded by saturation. For gray scale display, scale the disparity values so the lowest disparity is 0 and the highest disparity is 255.

4. Write a report discussing your results and showing sample images.