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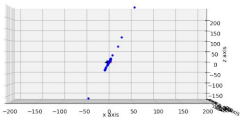
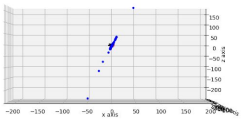
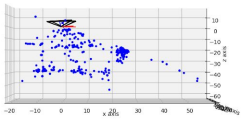
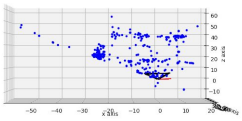
CSCI 5561: Assignment 5 - Stereo Reconstruction

The problem is implementation of stereo reconstruction algorithm when we are given two view images referencing the same place.

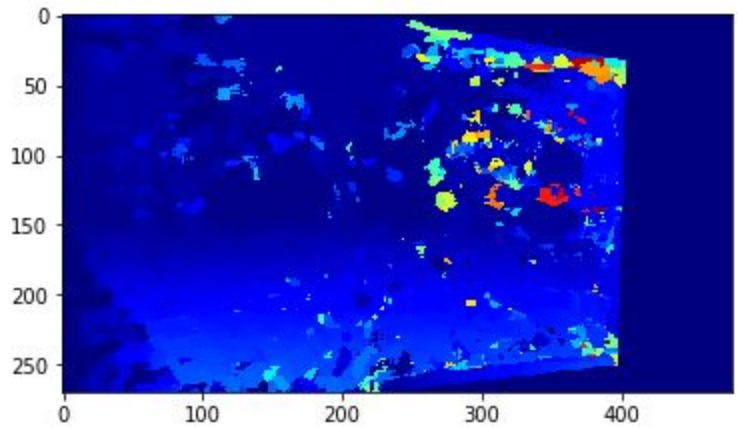

Above image shows the epipolar lines for the given images after computation of the fundamental matrix which is done by utilising the sift matches between the two images and 8 point algorithm supplemented by RANSAC approach for optimised result.

We triangulate the poses given two camera projection matrices and correspondences via linear triangulation method. Result of which is illustrated above.

Rectified images as shown above for the given images are computed after disambiguating the poses. Disambiguation is done by using rotation matrices, camera centers and 3D reconstructed points and applying chirelity condition to get points which lie in front of the camera. Rectification is computed by using relative camera pose and intrinsic parameter. This is

achieved via rectification homography. Rectification extends the epipoles to infinity and makes them horizontal.



Disparity map is computed as shown above through the rectified images. Dense sift matching approach is utilised and least disparity along the epipolar line is computed for each pixel in the left image with respect to right image.