VISNAV Exercise04

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1 Part 3

A robust loss fuction adds another optimization goal which makes the whole thing more robust to outliers. In calibration part we didn't have outliers, thus we didn't need to add an extra optimization goal which would increase the needed computation.

2 Part 4

First it is check if there exists any outliers apart from the normal reprojection error. Thank 4 criteria are checked. Number one checks for too large reprojection error, second checks for large projection error (if there are no other types), third one checks distance to the camera and finally last one checks for too small z coordinate. Reprojection errors can happen when detected keypoints are wrongly matched, severity of the erroneous match will increase the reprojection error. For points too close to the camera small movements will appear too large since the points is close which will make it hard to track it. Likewise for small Z coordinate. Also being too close to the camera will make it so that the camera might not be able to see the point properly from that angle.

3 Part 5
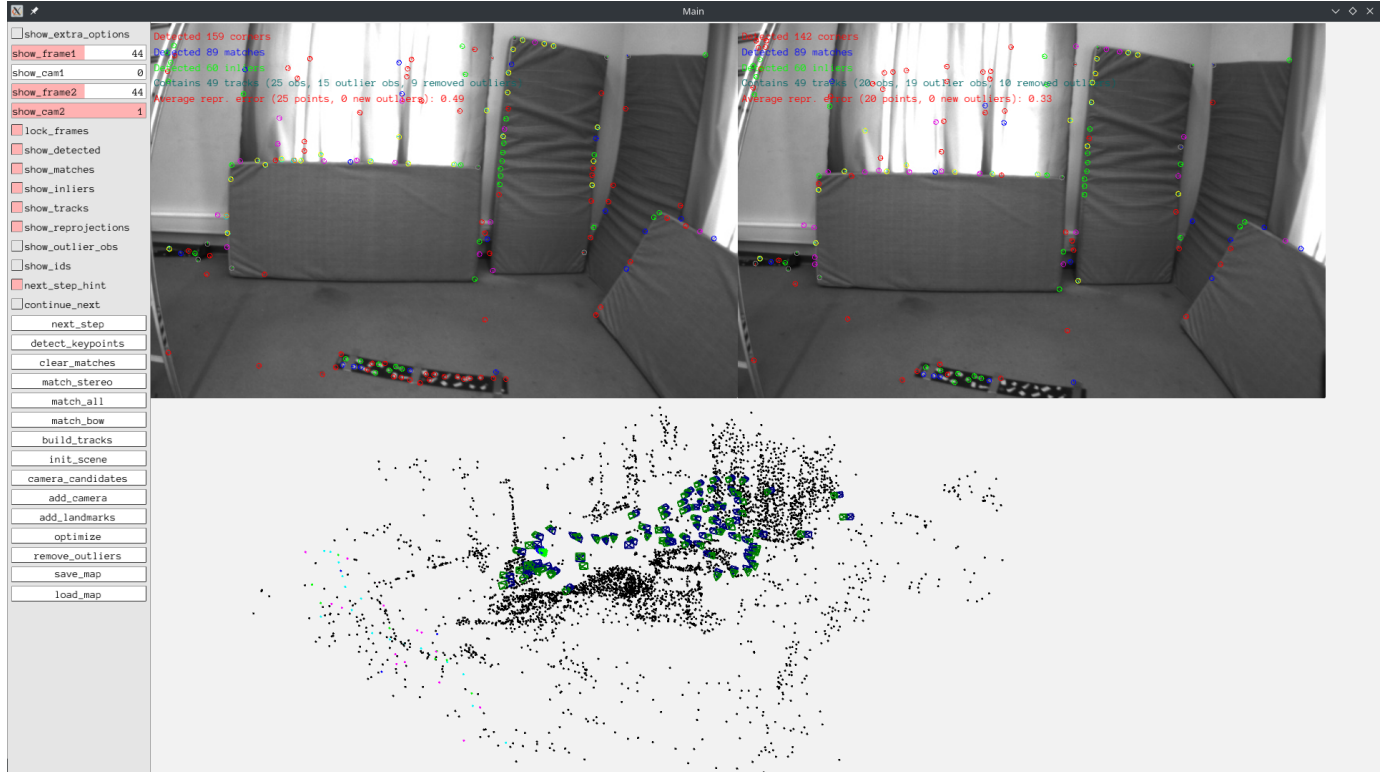
When used brute force matching 164 cameras are added to the map since there are 82 camera pair candidates in the beginning. The part that takes longest is the brute force matching, after which is the optimization part which is quite faster and the rest takes in around 40-60 seconds. I dont seem to have a suggestion to make it faster apart from using more parallelization for the computations such as CUDA kernels or more OpenMP directives where possible.

With match_bow the matching part takes a lot faster, at each step there are many more outliers that are being ignored. The map had 158 cameras and 4078 landmarks with 19769 observations. 139 landmarks were removed as outliers and 1643 observations were marked as outliers.