Vision-based Navigation Exercise 5

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1 Part 1

The workflow of the odometry system is as follows:

- Project existing landmarks to the current frame
- Compute keypoints and descriptors
- Compute the essential matrix
- Match the descriptors in frames and eliminate the outliers
- Match the detected inliers with the existing landmarks
- Localize the new camera position using the matches
- Add the new landmarks and delete the older ones
- Lastly, optimize the current pose accordingly

2 Part 3

Different from the sfm.cpp code, here we let another thread handle the bundle adjustment while the computation for the next frame is handled by the main thread. The variables opt_running and opt_finished corresponds to the state of the optimization, and they ensure that no new keyframe is added before optimization is finished. If they are removed then since there wouldn't be any synchronization between threads, we would add landmarks while they are still being optimized and the system would not be able to function properly.