



Loop closing based on image retrieval for SLAM back-end

Constructing consistent global maps is essential for a SLAM (simultaneous localization and mapping) algorithm. The correction of the map by closing trajectory loops is one of the successful ways to get consistent maps. In the literature we distinguish methods based on pose-graphs and methods based on image retrieval. Methods based on pose-graphs suffer from the drift when loops are large. This problem is solved by the appearance based methods for loop closure (i.e. FabMap [1], DBoW2[2]).

Existing SLAM algorithms can be used such as ORB-SLAM [3]. The algorithm should be evaluated on public datasets (Kitti Benchmark [4]).

Sub-tasks:

Extract visual feature vectors. Update the database. The indexing should be done in a way to allow for efficient database querying. A query should yield n candidates with their associated scores. A distance measure should be designed to compare the feature vectors and to compute the score.

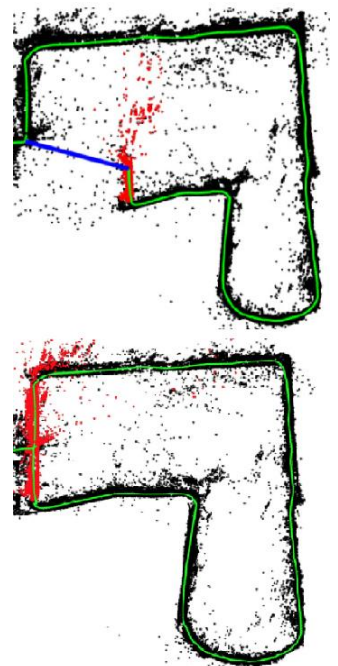
The SLAM algorithm uses the n candidates to check for valid loop closures. In the case of tracking loss the SLAM algorithm could use the n candidates to re-localize in the map.

Requirements:

C++ programming and basic image processing background.

Kontakt

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A trajectory before and after loop closure
Source: ORB-SLAM [3]

- [1] www.roboticsproceedings.org/rss05/p39.pdf
- [2] <https://github.com/dorian3d/DBoW2>
- [3] <http://webdiis.unizar.es/~raulmur/orbslam/>
- [4] http://www.cvlibs.net/datasets/kitti/eval_odometry.php