

(4) Feature Matching

The feature matching takes its starting point in the reference data and attempts to identify corresponding features in the OSM data set. Feature matching is a necessary precondition to compare single features rather than feature characteristics on study area a grid cell level, as well as for merging two data sets.

Method

Matching features in two road datasets with each their way of digitizing features and a potential one-to-many relationship between edges (for example in the case where one data set only maps road center lines, while the other map the geometries of each bike lane) is not a trivial task.

The method used here converts all network edges to smaller segments of a uniform length before looking for a potential match between the reference and the OSM data. The matching is done on the basis of the buffered distance between objects, the angle, and the undirected Hausdorff distance, and is based on the work of [Koukoletsos et al. \(2012\)](#) and [Will \(2014\)](#).

Based on the matching results, the following is computed:

- The number and length of matched and unmatched edges, in total and per grid cell
- A comparison of the attributes of the matched edges (is their classification of cycling infrastructure as protected or unprotected the same?)

Interpretation

Once the feature matching is complete, it is important to visually explore the results, since the success rate of the matching influences how the analysis of number of matches should be interpreted.

If the features in the two data sets have been digitized in very different ways - e.g. if one data set has digitized bike tracks as mostly straight lines, while the other includes more winding tracks, the matching will fail. This is also the case if they are placed too far from each other. If it visually can be confirmed that the same features do exist in both data sets, a lack of matches indicates that the geometries in the two data sets are too different. If it on the other hand can be confirmed that most real corresponding features have been identified, a lack of matches in an area indicates errors of commission or omission.

Sections

- [Match features](#)
 - Run feature matching
 - Plot results: matched vs. unmatched features
- [Analyze feature matching results](#)

- Matched features by infrastructure type
 - Local success rate of feature matching
 - [Summary](#)
 - Save results
-

Match Features

Run feature matching

Plot feature matching results

Matched and unmatched features in OSM and reference data sets

Summarized results

Analyze feature matching results

Comparison of infrastructure type in matched features

Local success rate of feature matching

In the plots below, the count, percent, and length of matched and unmatched features in each dataset are summarized.

Warning

The number of matched features in one dataset in a grid cell does not necessarily reflect the number of matched features in the other dataset, since an edge can be matched to a corresponding edge in another cell. Moreover, the local count refers to edges intersected with the grid cell. For example, a long bike lane crossing 3 cells will thus be counted as matched in 3 different cells. This does not change the relative distribution of matched/unmatched features, but it does entail that the overall summary of matched/unmatched features above uses a different total count of edges than the plots below.

Summary

