Feature matching

ORB is a type of binary descriptor. Such descriptors are typically matched using the Hamming Distance.

There are several methods for us to do feature matching in OpenCV. Some of the methods include Brute Force matcher, Fast Library for Approximate Nearest Neighbor (FLANN).

Brute force matcher in OpenCV will produce a list of DMatch objects (data structure). The DMatch objects have certain attributes: train index, query index, image index, and distance.

Train index: Index of train descriptor

Query index: Index of query descriptor

Image index: Index of train image

Distance: Distance between descriptors

Filtering

Lowe’s ratio test is a mathematical model used to filter bad matches from good ones. The ratio test will set a threshold value. Values that are **larger** than that threshold are treated as bad matches and are subsequently rejected.

Cross check test.

Geometric test.

Initialization phase

We take a certain number of frames to extract features and compute descriptors. We set these points as the train data points. This means that these points will be used as the reference to compare and match the points in subsequent frames. The points in the subsequent frames are the query points. We will compare the query points with the initial train points to determine if we have a match, after which we will draw a line between the matching points.

Matching phase

Reference frames should change after a certain number of frames have passed. This is to update the train points so that we can keep up with the changing environment.