

Criteria

MP.0 Mid-Term Report

Submission Requirements

Provide a Writeup / README that includes all the rubric points and how you addressed each one. You can submit your writeup as markdown or pdf.

This document is the mid-term report attached with the project. And all the text written in black is how addressed each rubric point.

Data Buffer

Criteria

MP.1 Data Buffer Optimization

Submission Requirements

Implement a vector for dataBuffer objects whose size does not exceed a limit (e.g. 2 elements). This can be achieved by pushing in new elements on one end and removing elements on the other end.

This has been carried out by removing the first element in the vector once the size exceeds the buffer size specified.

Keypoints

Criteria

MP.2 Keypoint Detection

Submission Requirements

Implement detectors HARRIS, FAST, BRISK, ORB, AKAZE, and SIFT and make them selectable by setting a string accordingly.

HARRIS, FAST, BRISK, ORB, AKAZE, and SIFT detectors have been implemented in the code and they are selectable by a string

MP.3 Keypoint Removal

Remove all keypoints outside of a pre-defined rectangle and only use the keypoints within the rectangle for further processing.

I used the method contains to implement this functionality. Calling the method contains on a rectangle object allows us to keep only the keypoints in the region of interest

Descriptors

Criteria	Submission Requirements
MP.4 Keypoint Descriptors	<p>Implement descriptors BRIEF, ORB, FREAK, AKAZE and SIFT and make them selectable by setting a string accordingly.</p> <p>BRIEF, ORB, FREAK, AKAZE and SIFT descriptors have been implemented and they are selectable using a string</p>
MP.5 Descriptor Matching	<p>Implement FLANN matching as well as k-nearest neighbor selection. Both methods must be selectable using the respective strings in the main function.</p> <p>FLANN matching and KNN have been implemented in the code and they are selectable using strings</p>
MP.6 Descriptor Distance Ratio	<p>Use the K-Nearest-Neighbor matching to implement the descriptor distance ratio test, which looks at the ratio of best vs. second-best match to decide whether to keep an associated pair of keypoints.</p> <p>Descriptor distance ratio test has been implemented within KNN algorithm and a distance threshold of 0.8 is used.</p>

Performance

Criteria	Submission Requirements
MP.7 Performance Evaluation 1	<p>Count the number of keypoints on the preceding vehicle for all 10 images and take note of the distribution of their neighborhood size. Do this for all the detectors you have implemented.</p> <p>Number of keypoints on the preceding vehicle for all 10 images are counted and recorded in the Camera 2D Features Evaluation.xlsx file attached. And a comment on the distribution of their neighborhood size is made in the file</p>

MP.8 Performance Evaluation 2

for each of HARRIS, FAST, BRISK, ORB, AKAZE, and SIFT keypoint detectors implemented and tested.

Count the number of matched keypoints for all 10 images using all possible combinations of detectors and descriptors. In the matching step, the BF approach is used with the descriptor distance ratio set to 0.8.

The number of matched keypoints for all 10 images are counted and recorded in the attached **Camera 2D Features Evaluation.xlsx** file using all possible combinations of detectors and descriptors. In the matching step, the BF approach is used with the descriptor distance ratio set to 0.8.

MP.9 Performance Evaluation 3

Log the time it takes for keypoint detection and descriptor extraction. The results must be entered into a spreadsheet and based on this data, the TOP3 detector / descriptor combinations must be recommended as the best choice for our purpose of detecting keypoints on vehicles.

The time it takes for keypoint detection and descriptor extraction is logged and recorded in the .xlsx file attached with the project. Based on this data, the TOP3 detector / descriptor combinations are recommended in the attached report file (**Mid Term Report: Camera Based 2D Feature Tracking.pdf**)