Finding the Best Feature Detector-Descriptor Combination

Addressing the image correspondence problem by feature matching is a central part of computer vision and 3D inference from images. Consequently, there is a substantial amount of work on evaluating feature detection and feature description methodology. However, the performance of the feature matching is an interplay of both detector and descriptor methodology. Our main contribution is to evaluate the performance of some of the most popular descriptor and detector combinations on the DTU Robot dataset, which is a very large dataset with massive amounts of systematic data aimed at two view matching. The size of the dataset implies that we can also reasonably make deductions about the statistical significance of our results. We conclude, that the MSER and Difference of Gaussian (DoG) detectors with a SIFT or DAISY descriptor are the top performers. This performance is, however, not statistically significantly better than some other methods. As a byproduct of this investigation, we have also tested various DAISY type descriptors, and found that the difference among their performance is statistically insignificant using this dataset. Furthermore, we have not been able to produce results collaborating that using affine invariant feature detectors carries a statistical significant advantage on general scene types.

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