Virtual Line Descriptor and Semi-Local Matching Method for Reliable Feature Correspondence

(Supplementary material to BMVC 2012 paper)

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Comparison of ASIFT and K-VLD

We compared the results of our K-VLD method with ASIFT [5] on a difficult scene. This scene is synthetic; images are available on IPOL [1]. We use the ASIFT source code from the authors, available on IPOL [2].

Matching results depend on a chosen threshold for the Lowe criterion [3], i.e., a maximum value for the ratio of the descriptor distance of the best match to the descriptor distance of the second best match. In our test, we use for ASIFT a maximum Lowe score of 0.73, which is the default value of the provided implementation. For SIFT [3], to put us in the worst situation (many ambiguities, hence many outliers), we use a maximum Lowe score of 0.99.

Figure 1 shows the matches found by SIFT (without any symmetric selection criterion). Filtering those matches with K-VLD removes most outliers. The remaining outliers are due to the imprecision of the detector, which slightly misplaces corresponding points.

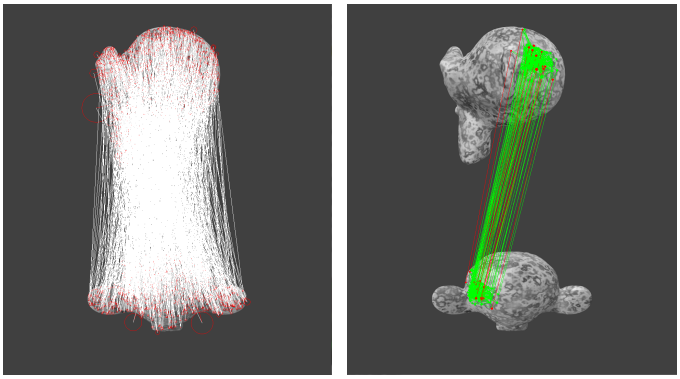

Figure 1: Left: SIFT matches (with Lowe score = 0.99, no symmetry).
Right: K-VLD filtering of these matches (+ K-VLD clusters).

Figure 2 similarly shows matches selected by ASIFT. Due to ambiguities and viewpoint change, there are many false matches. However, using K-VLD as a post-filter to ASIFT removes most outliers.

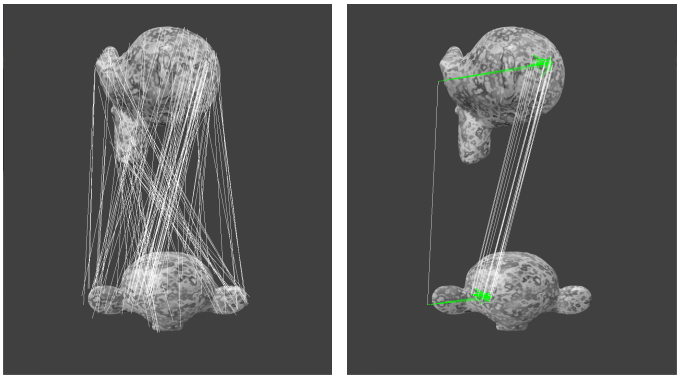

Figure 2: Left: ASIFT matches (with default Lowe score = 0.73).
Right: K-VLD filtering of these matches (+ K-VLD clusters).

Figure 3 shows the result of filtering the ASIFT matches with a state-of-the-art RANSAC-like algorithm, namely ORSA [4]. As discussed in the full paper, the output of ORSA still contains several outliers near the epipolar lines. But if we filter the ASIFT matches by K-VLD before feeding them into ORSA, most remaining false matches are removed.

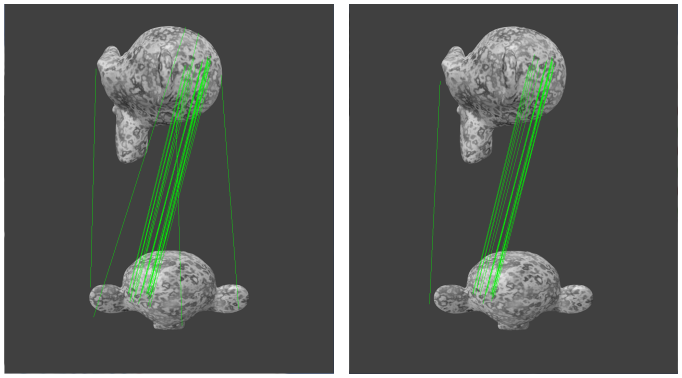

Figure 3: Left: ASIFT matches filtered by ORSA.
Right: ASIFT matches filtered by K-VLD, then by ORSA.

References

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