Evaluations on Matching Quality for 20 Different Descriptors and AKAZE Keypoints over Various Inlier Ratios

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Abstract. In this document, we present additional results on the mean accuracy, precision, recall, and fall-out over various inlier ratios. The evaluations are performed on numerous datasets for different descriptors using AKAZE [1] keypoints.

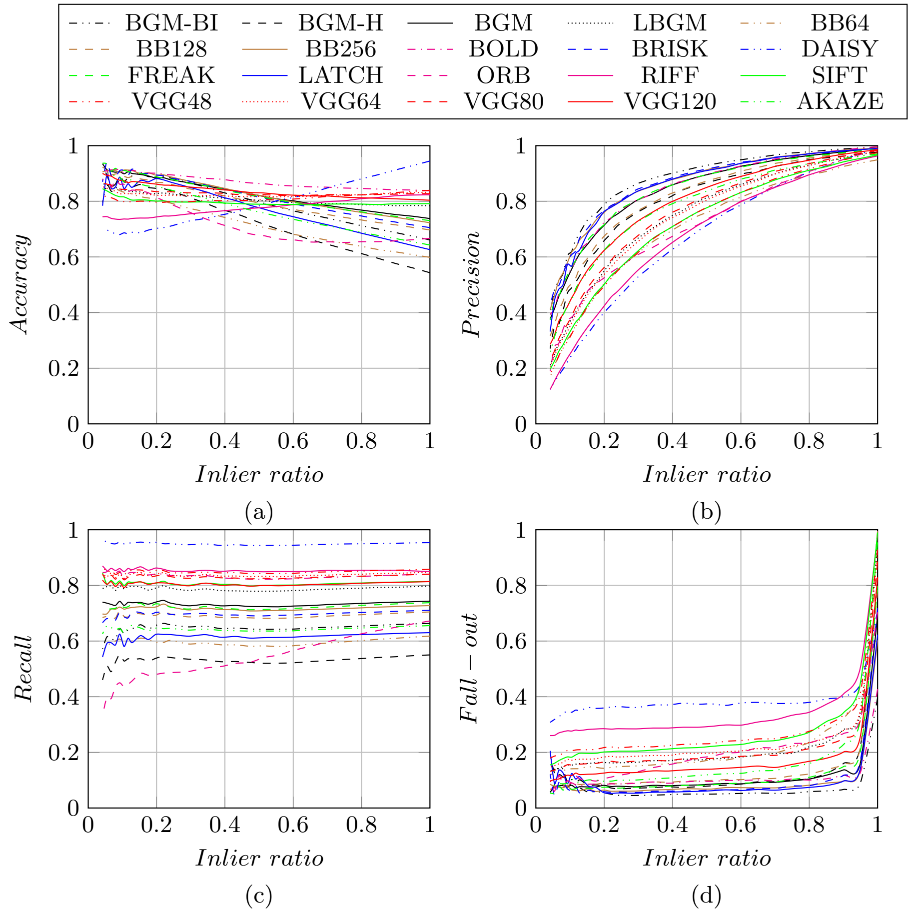

Fig. 1. Varying inlier ratio compared to mean (a) accuracy, (b) precision, (c) recall, and (d) fall-out using AKAZE keypoints for the entire **KITTI disparity dataset** from Menze and Geiger [2]. For comparison, the following descriptors are used: AKAZE [1], BOLD [3], BRISK [4], DAISY [5], FREAK [6], LATCH [7], ORB [8], RIFF [9], SIFT [10], BGM-Bilinear (BGM-BI) [11], BGM-Hard (BGM-H) [11], BGM [11], LBGM [11], BinBoost [12, 13] with a descriptor size of 64 bits (BB64), 128 bits (BB128), and 256 bits (BB256), in addition to the VGG descriptor [14] with a descriptor size of 48 bits (VGG48), 64 bits (VGG64), 80 bits (VGG80), and 120 bits (VGG120). On the results of all algorithms, a ratio test is performed.

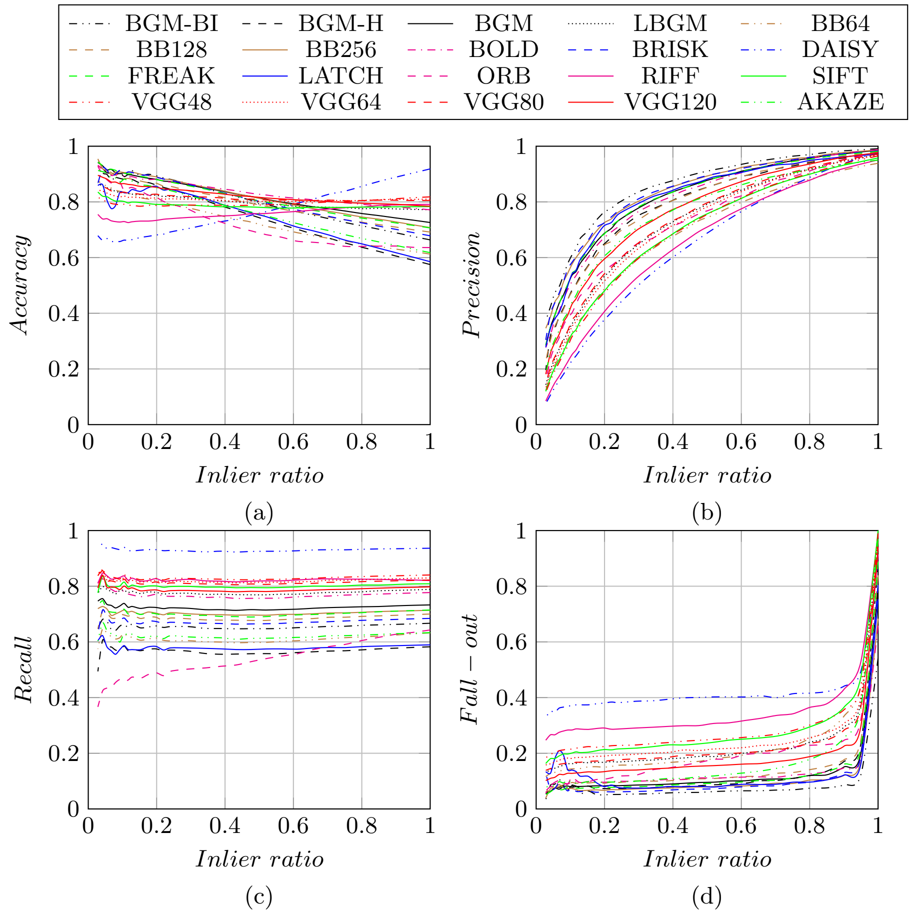

Fig. 2. Varying inlier ratio compared to mean (a) accuracy, (b) precision, (c) recall, and (d) fall-out using AKAZE keypoints for the entire **KITTI flow dataset** from Menze and Geiger [2]. For comparison, the following descriptors are used: AKAZE [1], BOLD [3], BRISK [4], DAISY [5], FREAK [6], LATCH [7], ORB [8], RIFF [9], SIFT [10], BGM-Bilinear (BGM-BI) [11], BGM-Hard (BGM-H) [11], BGM [11], LBGM [11], BinBoost [12, 13] with a descriptor size of 64 bits (BB64), 128 bits (BB128), and 256 bits (BB256), in addition to the VGG descriptor [14] with a descriptor size of 48 bits (VGG48), 64 bits (VGG64), 80 bits (VGG80), and 120 bits (VGG120). On the results of all algorithms, a ratio test is performed.

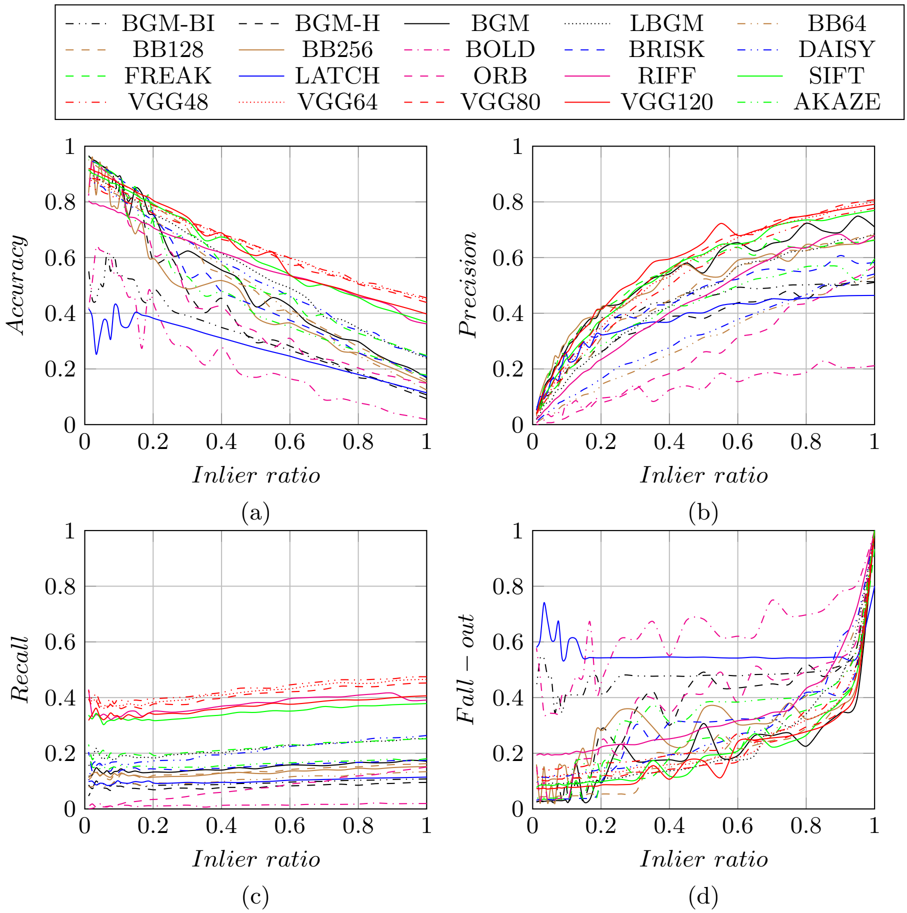

Fig. 3. Varying inlier ratio compared to mean (a) accuracy, (b) precision, (c) recall, and (d) fall-out using AKAZE keypoints for the entire **"graffiti" dataset** from Mikolajczyk *et al.* [15, 16]. For comparison, the following descriptors are used: AKAZE [1], BOLD [3], BRISK [4], DAISY [5], FREAK [6], LATCH [7], ORB [8], RIFF [9], SIFT [10], BGM-Bilinear (BGM-BI) [11], BGM-Hard (BGM-H) [11], BGM [11], LBGM [11], Bin-Boost [12, 13] with a descriptor size of 64 bits (BB64), 128 bits (BB128), and 256 bits (BB256), in addition to the VGG descriptor [14] with a descriptor size of 48 bits (VGG48), 64 bits (VGG64), 80 bits (VGG80), and 120 bits (VGG120). On the results of all algorithms, a ratio test is performed.

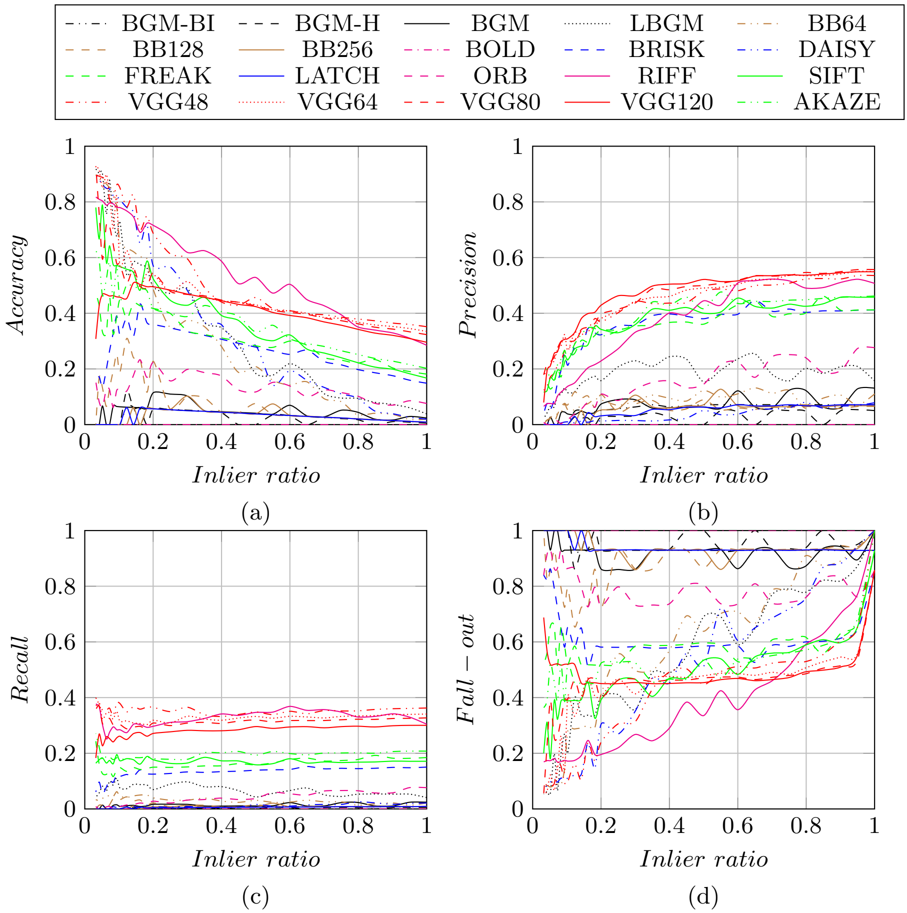

Fig. 4. Varying inlier ratio compared to mean (a) accuracy, (b) precision, (c) recall, and (d) fall-out using AKAZE keypoints for the entire **"bark" dataset** from Mikolajczyk *et al*. [15, 16]. For comparison, the following descriptors are used: AKAZE [1], BOLD [3], BRISK [4], DAISY [5], FREAK [6], LATCH [7], ORB [8], RIFF [9], SIFT [10], BGM-Bilinear (BGM-BI) [11], BGM-Hard (BGM-H) [11], BGM [11], LBGM [11], Bin-Boost [12, 13] with a descriptor size of 64 bits (BB64), 128 bits (BB128), and 256 bits (BB256), in addition to the VGG descriptor [14] with a descriptor size of 48 bits (VGG48), 64 bits (VGG64), 80 bits (VGG80), and 120 bits (VGG120). On the results of all algorithms, a ratio test is performed.

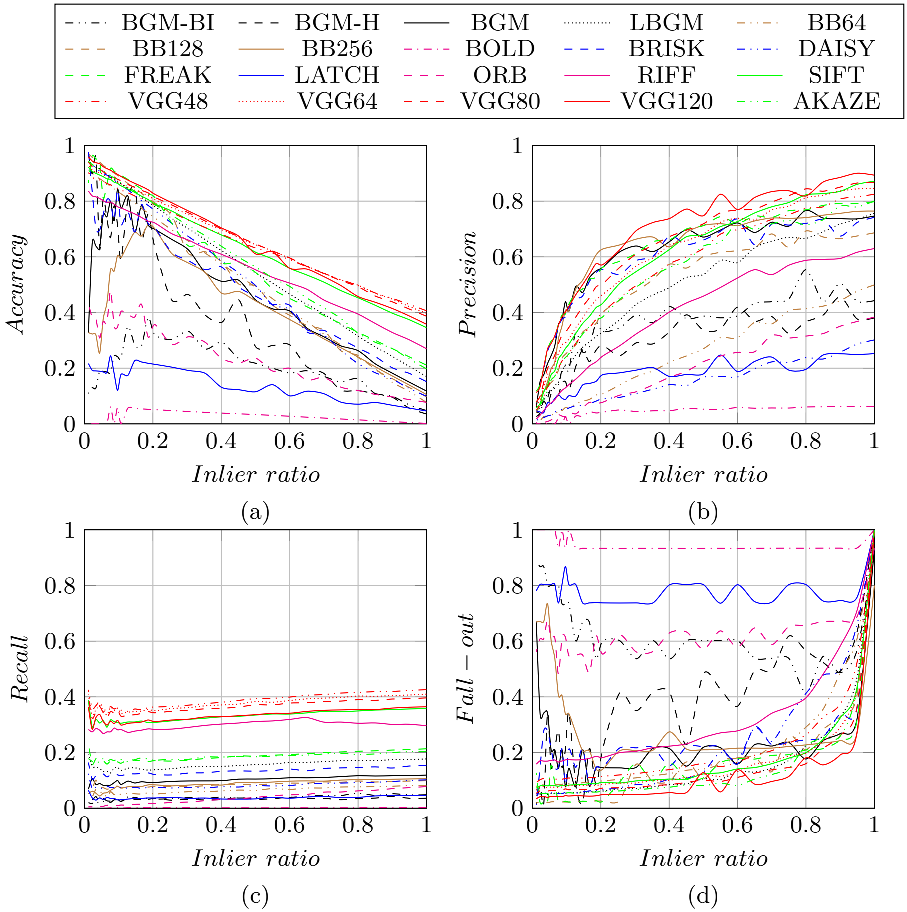

Fig. 5. Varying inlier ratio compared to mean (a) accuracy, (b) precision, (c) recall, and (d) fall-out using AKAZE keypoints for the entire **"boat" dataset** from Mikolajczyk *et al*. [15, 16]. For comparison, the following descriptors are used: AKAZE [1], BOLD [3], BRISK [4], DAISY [5], FREAK [6], LATCH [7], ORB [8], RIFF [9], SIFT [10], BGM-Bilinear (BGM-BI) [11], BGM-Hard (BGM-H) [11], BGM [11], LBGM [11], Bin-Boost [12, 13] with a descriptor size of 64 bits (BB64), 128 bits (BB128), and 256 bits (BB256), in addition to the VGG descriptor [14] with a descriptor size of 48 bits (VGG48), 64 bits (VGG64), 80 bits (VGG80), and 120 bits (VGG120). On the results of all algorithms, a ratio test is performed.

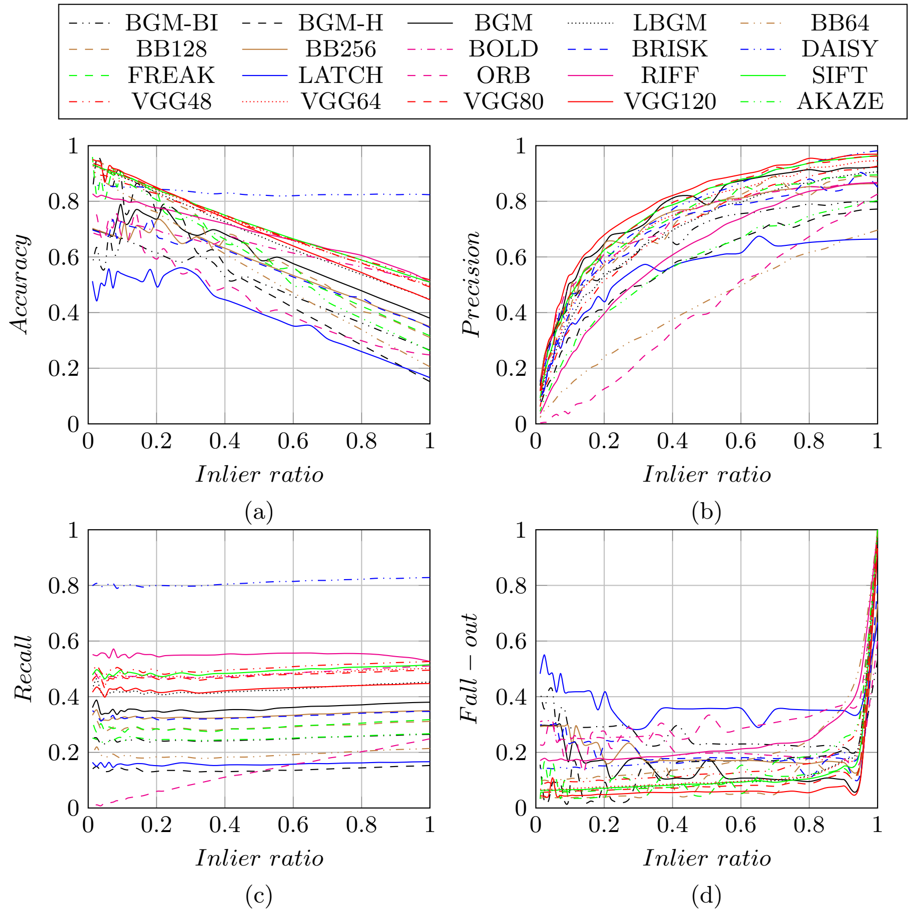

Fig. 6. Varying inlier ratio compared to mean (a) accuracy, (b) precision, (c) recall, and (d) fall-out using AKAZE keypoints for the entire **"wall" dataset** from Mikolajczyk *et al*. [15, 16]. For comparison, the following descriptors are used: AKAZE [1], BOLD [3], BRISK [4], DAISY [5], FREAK [6], LATCH [7], ORB [8], RIFF [9], SIFT [10], BGM-Bilinear (BGM-BI) [11], BGM-Hard (BGM-H) [11], BGM [11], LBGM [11], Bin-Boost [12, 13] with a descriptor size of 64 bits (BB64), 128 bits (BB128), and 256 bits (BB256), in addition to the VGG descriptor [14] with a descriptor size of 48 bits (VGG48), 64 bits (VGG64), 80 bits (VGG80), and 120 bits (VGG120). On the results of all algorithms, a ratio test is performed.

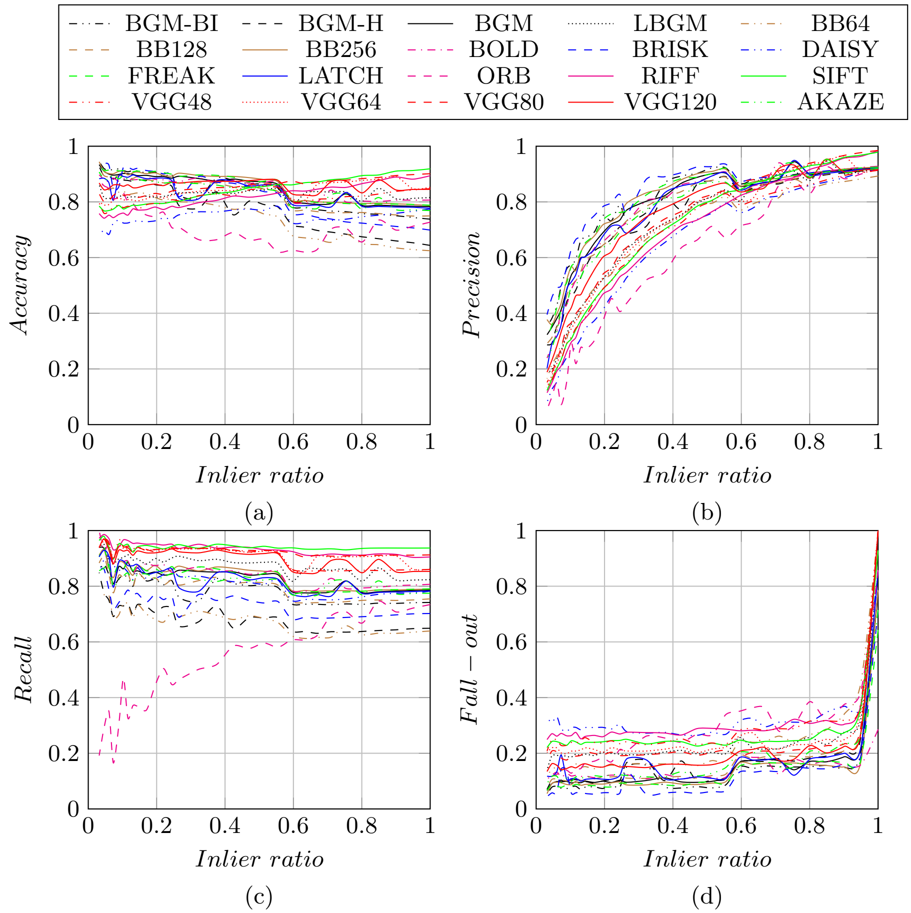

Fig. 7. Varying inlier ratio compared to mean (a) accuracy, (b) precision, (c) recall, and (d) fall-out using AKAZE keypoints for the entire **"bikes" dataset** from Mikolajczyk *et al.* [15, 16]. For comparison, the following descriptors are used: AKAZE [1], BOLD [3], BRISK [4], DAISY [5], FREAK [6], LATCH [7], ORB [8], RIFF [9], SIFT [10], BGM-Bilinear (BGM-BI) [11], BGM-Hard (BGM-H) [11], BGM [11], LBGM [11], Bin-Boost [12, 13] with a descriptor size of 64 bits (BB64), 128 bits (BB128), and 256 bits (BB256), in addition to the VGG descriptor [14] with a descriptor size of 48 bits (VGG48), 64 bits (VGG64), 80 bits (VGG80), and 120 bits (VGG120). On the results of all algorithms, a ratio test is performed.

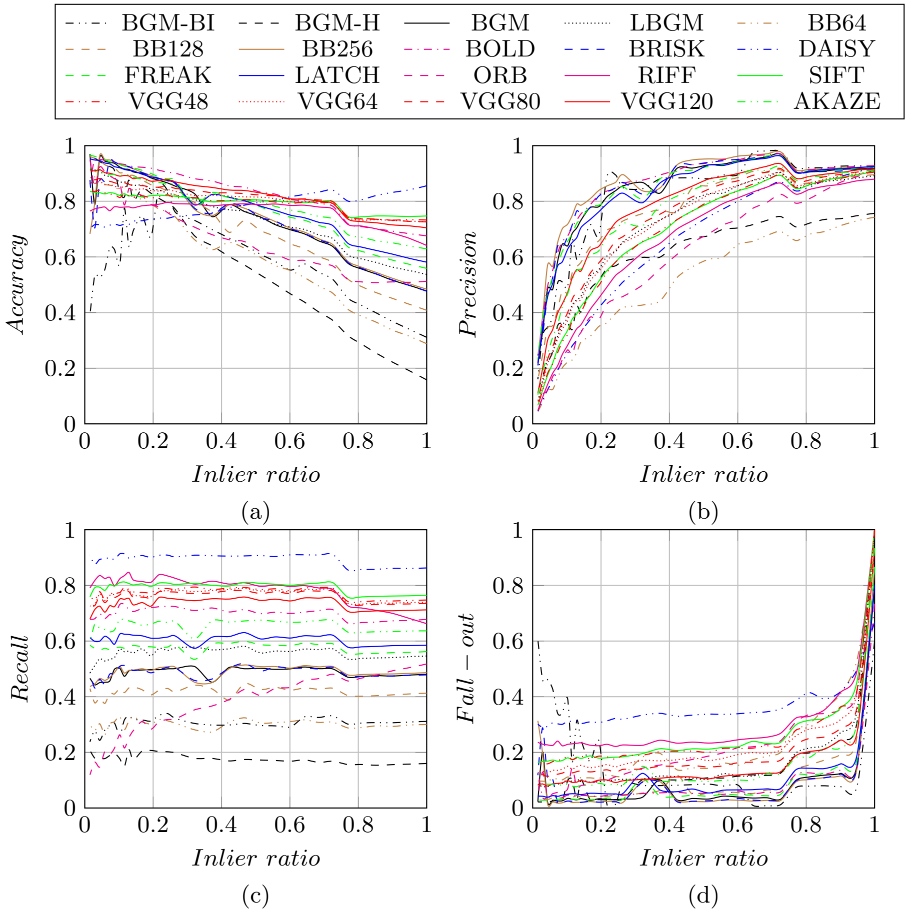

Fig. 8. Varying inlier ratio compared to mean (a) accuracy, (b) precision, (c) recall, and (d) fall-out using AKAZE keypoints for the entire **"JPEG" dataset** from Mikolajczyk *et al.* [15, 16]. For comparison, the following descriptors are used: AKAZE [1], BOLD [3], BRISK [4], DAISY [5], FREAK [6], LATCH [7], ORB [8], RIFF [9], SIFT [10], BGM-Bilinear (BGM-BI) [11], BGM-Hard (BGM-H) [11], BGM [11], LBGM [11], Bin-Boost [12, 13] with a descriptor size of 64 bits (BB64), 128 bits (BB128), and 256 bits (BB256), in addition to the VGG descriptor [14] with a descriptor size of 48 bits (VGG48), 64 bits (VGG64), 80 bits (VGG80), and 120 bits (VGG120). On the results of all algorithms, a ratio test is performed.

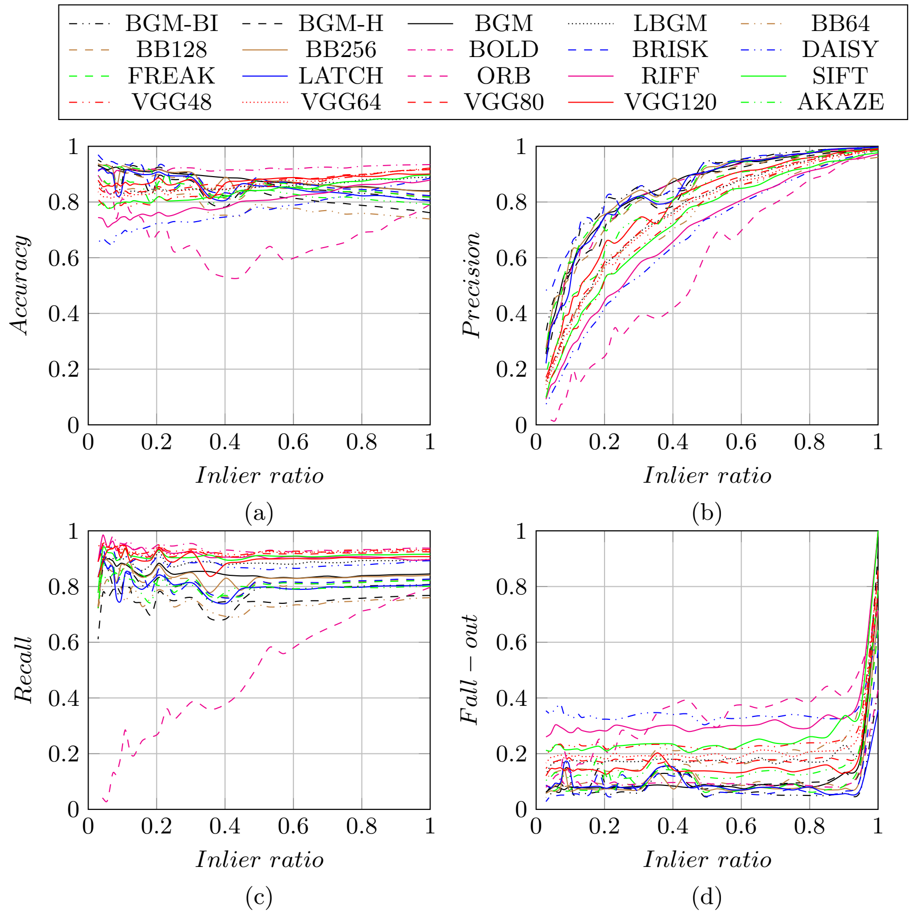

Fig. 9. Varying inlier ratio compared to mean (a) accuracy, (b) precision, (c) recall, and (d) fall-out using AKAZE keypoints for the entire **"light" dataset** from Mikolajczyk *et al*. [15, 16]. For comparison, the following descriptors are used: AKAZE [1], BOLD [3], BRISK [4], DAISY [5], FREAK [6], LATCH [7], ORB [8], RIFF [9], SIFT [10], BGM-Bilinear (BGM-BI) [11], BGM-Hard (BGM-H) [11], BGM [11], LBGM [11], Bin-Boost [12, 13] with a descriptor size of 64 bits (BB64), 128 bits (BB128), and 256 bits (BB256), in addition to the VGG descriptor [14] with a descriptor size of 48 bits (VGG48), 64 bits (VGG64), 80 bits (VGG80), and 120 bits (VGG120). On the results of all algorithms, a ratio test is performed.

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